

REMOTE FILL AREAS - ANALYTICAL DATA SUMMARY
PDFI SUPPLEMENTAL INVESTIGATION



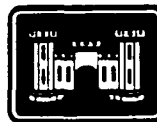
NL/TARACORP
SUPERFUND SITE
GRANITE CITY, ILLINOIS



Prepared for

U.S. Environmental Protection Agency
Region V
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**NL/TARACORP SUPERFUND PROJECT
REMOTE FILL AREAS - ANALYTICAL DATA SUMMARY
PDFI SUPPLEMENTAL INVESTIGATION**

**1.0
PROJECT DESCRIPTION**

1.1 INTRODUCTION

This data submittal is part of Woodward-Clyde's (W-C) Indefinite Delivery Contract with the U.S. Army Corps of Engineers, Omaha District (USACE), Contract No. DACW45-93-D-0005, Work Order No. 0014. This report presents the analytical data for samples collected from the remote fill areas during the Predesign Field Investigation (PDFI) Supplemental Investigation. Remediation recommendations and other related data (field maps, boring logs, field data sheets, laboratory data, etc.) will be provided in the PDFI Supplemental Investigation technical report to be submitted to USACE from W-C in spring, 1994.

1.2 SITE INFORMATION

The NL Site is located in the cities of Granite City, Madison, and Venice, in Madison County, Illinois, approximately two miles east of St. Louis, Missouri (**Figure 1**). Additional areas have been identified since the Remedial Investigation (RI) and PDFI investigation where soil containing hard rubber battery casing material from the Taracorp waste pile was used as fill. The remote fill areas sampled during the PDFI Supplemental Investigation included 21 locations in Eagle Park Acres, one residence and 38 alleys in Venice, one location in Granite City, and two locations in Glen Carbon, Illinois (**Figures 2 and 3**).

1.3 PREVIOUS INVESTIGATIONS

A RI at the NL Site was completed by O'Brien and Gere in September, 1988. A PDFI was completed by W-C in March, 1993. The extent of contamination for each of the areas of

concern is discussed in the PDFI CDAP (W-C, 1991) and PDFI Final Report (W-C, 1993).

The Record of Decision (ROD) for the NL Site was issued by the United States Environmental Protection Agency (USEPA) on March 30, 1990. To adequately protect human health and the environment, the ROD requires the removal of all soils and battery casing materials with lead concentrations greater than 500 parts per million (ppm) in residential areas, the removal of all soils and battery casing material with lead concentrations greater than 1000 ppm in the industrial area, and removal of battery case material from alleys and driveways. These areas would then be restored to their original state, with the exception of remediated alleys and driveways which would be paved.

Subsequent to the submittal of the PDFI Final Report (W-C, 1993) for the NL Site, additional remote fill areas were identified. Information for the remedial design is needed for these areas. Information necessary for remedial design includes identifying the areas which contain the hard rubber battery casing material and determining the volume of the fill material.

In previous USEPA investigations and during the RI/FS public comment period, it was determined that the areas where hard rubber battery casing material from the Taracorp and SLLR piles had been used for fill material were more extensive than presented in the RI/FS. During the PDFI Supplemental Investigation, soil samples were collected from the following areas:

- Thirty-eight (38) alleys in Venice, Illinois
- Twenty-One (21) areas in Eagle Park Acres, Madison, Illinois
- Glen Carbon Alley (corner of Guy and Meridian Streets)
- 276 Collinsville Street, Glen Carbon, Illinois
- 205 Abbott, Venice, Illinois
- 3213 Colgate, Granite City, Illinois

The location of these areas is shown in relation to the NL Site in Figures 2 and 3.

2.1 SAMPLING LOCATIONS

A total of 259 soil borings were drilled and completed in the Remote Fill Areas using both hand augers and a truck mounted drill rig. A total of 294 soil samples were collected for Total Lead and 166 for TCLP-Lead. Specific sampling programs were developed for each of the Remote Fill Areas.

2.1.1 Venice Alleys

Fifty-three alleys in Venice, Illinois, have been documented by USEPA personnel to have fill material present containing rubber battery casing material (**Figure 4**). These alleys have been grouped into four categories by USEPA personnel based on visual inspection:

- **Category I:** Severe contamination requiring immediate action. These 15 alleys will be sampled and remediated by OHM as part of the ongoing USACE Rapid Response Program.
- **Category II:** Extensive hard rubber battery casing material present. These 23 alleys were sampled by W-C as part of the Supplemental Investigation. Samples collected were analyzed for Total Lead concentration and for TCLP-Lead.
- **Category III:** Scattered hard rubber battery casing material present. These 15 alleys were sampled by W-C as part of the Supplemental Investigation. Samples collected were analyzed for Total Lead concentration. Those samples that were found to exceed the 500 mg/kg action level specified in the ROD were also analyzed for TCLP-Lead.
- **Category IV:** Paved or very minor concentrations of hard rubber battery casing material noted. No action required at this time.

W-C used hand augers to sample 15 of the alleys in Category III and a drill rig to sample 23 of the alleys in Category II (**Figure 4**). A total of 152 borings were completed in the thirty-eight alleys to delineate the vertical extent of the remote fill. To delineate the areal extent of the remote fill, a visual inspection was completed in each of the thirty-eight alleys.

2.1.2 Eagle Park Acres

A total of twenty-one properties were sampled in the Eagle Park Acres subdivision in Madison, Illinois (**Figure 5**). To estimate the areal extent of fill in each of the lots

investigated in Eagle Park Acres, a visual inspection was completed at each of these properties. To estimate the depth, four borings were drilled in each of the lots except for 104 Carver where eight borings were drilled and 126 Carver where two borings were drilled. A list of the properties sampled and the respective samples collected are presented in Table 1.

2.1.3 Other Remote Fill Areas

Several other Remote Fill Areas were investigated. Two of these were in Glen Carbon, Illinois: an alley at the intersection of Guy and Meridian streets; and an abandoned road at 276 Collinsville Street. The other two Remote Fill Areas were a residential property at 205 Abbott Street in Venice, Illinois, and a residential property at 3213 Colgate Avenue in Granite City, Illinois. To determine the depth of remote fill, four hand auger borings (HAB's) were completed at each location except the alley in Glen Carbon where eight drill rig borings were completed. Visual inspections were completed at each property to determine the areal extent of the fill material.

2.2 SAMPLING PROCEDURES

The sampling was conducted as described in SOPs No. 1, 5, 6, 7 and 9 in the PDFI CDAP. The borings were backfilled with bentonite chips upon completion. The spoils from the borings were drummed and taken to the Taracorp pile. The drums were labeled and secured. The samples were sent to Environmetrics, Inc. and USACE-Missouri River Division (MRD) Laboratory, respectively, for analysis. Documentation included recording the sample information on the chain-of-custody, sample collection field sheets and field log books. Boring logs were completed for each boring, and a map was sketched of visual surface contamination. The number of borings taken for each location and the number of soil samples collected and analyzed are summarized in Table 1. The boring logs, field data sheets, and field maps will be provided in the PDFI Supplemental Investigation technical report.

Analytical soil samples collected from the Remote Fill Areas were analyzed for Total Lead

(EPA method 3051/7420), and/or the Toxicity Characteristic Leaching Procedure for Lead (TCLP-Lead) (EPA method 1311/1310/7420) in accordance with USEPA SW-846 guidelines and protocols (Table 2).

Analytical soil samples were delivered at the end of each workday by W-C personnel to Environmetrics in St. Louis, Missouri, a USACE approved laboratory. Sample handling, documentation, and custody transfer were done in accordance with USEPA SW-846 chain-of-custody protocols. Additional samples were collected for Quality Control/Quality Assurance (QC/QA). The Quality Assurance samples were shipped via Federal Express to the USACE Missouri River Division (MRD) Laboratory in Omaha, Nebraska.

2.2.1 Venice Alleys

Borings in the Category II Venice Alleys were completed using a CME-55 truck mounted rig with 4 1/4 inch I.D. hollow stem augers (HSA). Continuous split spoon samples were taken for visual inspection to a depth of one foot below the base of fill using a 2 inch I.D. stainless steel split spoon sampler. Twenty-three alleys were sampled by completing four borings per alley. A total of 92 analytical samples were collected from within the fill material for Total Lead and TCLP-Lead analysis. Due to overhead power line restrictions, the drill rig was not able to sample three of the Category II alleys. These three alleys were sampled instead by the hand auger team.

Fifteen alleys were sampled as part of the Category III alleys with stainless steel hand augers to a depth of 3 inches. Sixty samples were taken for Total Lead analysis from the fill material. The samples were also analyzed for TCLP-Lead if the Total Lead results exceeded the 500 ppm standard.

2.2.2 Eagle Park Acres

All of the sampling in Eagle Park Acres was completed using HAB's except for the nine borings in the Watson Alley which were completed with the drill rig. Each HAB was advanced to a depth of approximately one foot below the base of fill or to a maximum depth of four feet. The depths at which samples were collected were dependent on the thickness

QUALITY ASSURANCE/ QUALITY CONTROL MEASURES

The overall Quality Assurance objective for the field activities at the NL Site is to develop and implement procedures for sampling, laboratory analyses, field measurements, and for reporting that provided a quality of data that is consistent with and adequate for the intended uses of that data. The sample set, chemical analytical results, and interpretations must be based on data that met or exceeded quality assurance objectives established for the project. These objectives for field and laboratory analytical data, as well as nonchemical data are discussed in the appropriate SOPs included in the PDFI CDAP.

Additional soil samples were collected and submitted to the analytical laboratory to provide a means to assess the quality of the data resulting from the field sampling program.

3.1 QUALITY CONTROL EFFORT

The QC level of effort for the Total Lead analysis consisted of field duplicates, matrix spikes, laboratory duplicates and rinsate blanks. These samples were each collected at rates of 5 percent of the total number of samples collected except for the rinsate blanks. A minimum of one rinsate blank for every 100 investigative soil samples (1 %) was collected. The QC level of effort for the TCLP-lead analysis was a minimum of one duplicate and one matrix spike for every 20 soil samples selected for TCLP analysis. The level of QC effort for each area is summarized in Table 3.

The level of QC effort provided by the laboratory was equivalent to the level of QC effort specified in "Test Methods for Evaluating Solid Waste", USEPA SW-846, Third Edition, 1986.

3.2 QUALITY ASSURANCE EFFORT

The QA level of effort consisted of field duplicates and rinsate blanks which were submitted to the USACE MRD Laboratory. QA field duplicates were collected at a rate of 10 percent

of the total field samples, and a rinsate blank was collected for every 100 field samples. The level of QA effort for each area is summarized in Table 3.

3.3 DATA REDUCTION, VALIDATION, AND REPORTING

The data generated by the analytical laboratory was checked for accuracy and completeness. The data validation process for this project consisted of data generation, reduction, and three levels of review.

The first level of review was conducted by the analytical laboratory which has the initial responsibility for the correctness and completeness of the data. All data were generated and reduced following guidelines specified in the Environmetrics Quality Assurance Manual. The laboratory evaluated the quality of the work based on an established set of laboratory guidelines.

The second level of review was performed by W-C to provide an independent validation of the laboratory data package. The validation process was conducted in accordance to an established set of guidelines entitled "Guidelines for Non-CLP Chemical Data Evaluation" (USEPA, 1988).

The third level of review was conducted by the W-C Project QA/QC Officer or his/her representative who randomly audited representative project data packages.

A detailed discussion of Data Reduction, Validation, and Reporting can be found in Section 8.0 of the PDFI CDAP.

ANALYTICAL RESULTS

A total of 294 soil samples for Total Lead and 166 soil samples for TCLP-Lead were analyzed from the Remote Fill Areas. The analytical results of these samples are listed in Table 4. An explanation of the sample identification number is provided in Table 5.

4.1 VENICE ALLEYS

A total of 152 soil samples for Total Lead and 112 soil samples for TCLP-Lead were analyzed from 38 alleys in Venice, Illinois (Table 1). The range of Total Lead concentrations in these samples was 19.1 mg/kg to 16,200 mg/kg (Table 4). The range of TCLP-Lead concentration in these samples was < 0.1 mg/L to 204 mg/L (Table 4). Thirty of the alleys had areas of soil with a Total Lead concentration greater than the action level specified in the ROD of 500 ppm. Eleven of the alleys had areas of soil with a TCLP-Lead concentration greater than the hazardous waste regulatory level of 5.0 mg/L.

4.2 EAGLE PARK ACRES

A total of 118 soil samples for Total Lead and 48 soil samples for TCLP-Lead were analyzed from 20 residential properties and one alley in Eagle Park Acres, Madison, Illinois (Table 1). The range of Total Lead concentrations in these samples was 11.4 mg/kg to 26,300 mg/kg (Table 4). The range of TCLP-Lead concentration in these samples was < 0.1 mg/L to 1,687 mg/L (Table 4). Thirteen of the residential properties and the Watson alley had areas of soil with Total Lead concentration greater than the 500 ppm action level specified in the ROD. Four of the residential properties and the alley had areas of soil with a TCLP-Lead concentration greater than the hazardous waste regulatory level of 5.0 mg/L.

4.3 OTHER REMOTE FILL AREAS

A total of 24 soil samples for Total Lead and six soil samples for TCLP-Lead were analyzed from one residential property and one alley in Glen Carbon, Illinois, one residential property in Venice, Illinois, and one residential property in Granite City, Illinois (Table 1). The range of Total Lead concentrations in these samples was 10.3 mg/kg to 6,798 mg/kg (Table 4). The range of TCLP-Lead concentration in these samples was < 0.1 mg/L to 23.2 mg/L (Table 4). For the soil samples taken at the three residential properties the Total Lead concentration was less than 500 ppm, although the property at 276 Collinsville Road in Glen Carbon had visual contamination of battery casing material. The alley in Glen Carbon had areas of soil with Total Lead concentration greater than the 500 ppm action level specified in the ROD and TCLP-Lead concentration greater than the 5.0 mg/L hazardous waste regulatory level.

TABLES

TABLE 1

**SAMPLING LOCATION AND ANALYSIS SUMMARY
REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE**

LOCATION	HAND AUGER BORINGS	DRILL RIG BORINGS	TOTAL LEAD	TCLP LEAD
VENICE ALLEYS	70	82	152	112
EAGLE PARK ACRES:				
200 ALLEN	4	0	6	6
203 ALLEN	4	0	5	2
123 BOOKER	4	0	8	8
104 CARVER	8	0	14	12
126 CARVER	2	0	2	0
212 CARVER	4	0	4	1
101 HARRISON	4	0	5	1
95 HILL	4	0	2	0
206 HILL	4	0	4	0
209 HILL	4	0	5	1
211 HILL	4	0	8	3
212 HILL	4	0	5	0
202 TERRY	4	0	4	1
204 TERRY	4	0	4	3
210 WATSON	4	0	4	3
212 WATSON	4	0	3	1
213 WATSON	4	0	4	0
214 WATSON	4	0	3	1
215 WATSON	4	0	4	2
217 WATSON	4	0	6	0
WATSON ALLEY	0	9	18	3
OTHER REMOTE FILL:				
3213 COLGATE	2	0	2	0
205 ABBOTT	2	0	2	0
GLEN CARBON ALLEY	0	8	16	6
276 COLLINSVILLE STREET	4	0	4	0
PROJECT TOTALS (1)	160	99	294	166

(1) TOTALS DO NOT INCLUDE QA/QC SAMPLES

TABLE 2

**SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES
NL/TARACORP SUPERFUND SITE**

Method	Parameter	Type of sample	Number of Containers per Sample	Minimum Sample Size	Preservation	Holding Time
3050 / 6010	Total Lead	Soil	One 4oz wide mouth poly jar with Teflon lined lid	10 g	4 deg C	6 months
1311 / 3010 / 6010	TCLP Lead	Soil	One 4oz wide mouth poly jar with Teflon lined lid	100 g	4 deg C	6 months
3020 / 7421	Lead	Water (Rinsate)	1 L Poly	1 L	Nitric Acid to pH < 2 & 4 deg C	6 months

TABLE 3
SAMPLE DISTRIBUTION AND FREQUENCY SUMMARY
REMOTE FILL AREAS
NI/TARACORP SUPERFUND SITE
PDI-1 SUPPLEMENTAL INVESTIGATION

LOCATION	PARAMETER	QUALITY CONTROL						TOTAL W-C SAMPLES	QUALITY ASSURANCE		
		FIELD SAMPLES	FIELD DUPLICATES	MATRIX SPIKE SAMPLES	LAB DUPLICATE SAMPLES	RINSATE BLANKS	TOTAL QC SAMPLES		FIELD DUPLICATES	RINSATE BLANKS	TOTAL QA SAMPLES
EAGLE PARK ACRES TOTAL	TOTAL LEAD	118	6	7	7	1	21	139	12	1	13
	TCLP LEAD	48	3	5	0	0	8	56	0	0	0
OTHER REMOTE FILL AREAS TOTAL	TOTAL LEAD	24	1	2	2	0	5	29	2	0	2
	TCLP LEAD	6	0	0	0	0	0	6	0	0	0
VENICE ALLEYS TOTAL	TOTAL LEAD	152	8	11	11	1	31	183	15	0	15
	TCLP LEAD	114	6	8	0	0	14	128	8	0	8
PROJECT TOTALS	TOTAL LEAD	294	15	20	20	2	57	351	29	1	30
	FREQUENCY (%)		5.1	6.8	6.8		19.4		9.9		10.2
	TCLP LEAD	168	9	13	0	0	22	190	8	0	8
	FREQUENCY (%)		5.4	7.7			13.1		4.8 (1)		4.8 (1)

(1) The QA frequency goal of 10% was met for soil samples where TCLP - Lead analysis was originally planned. No QA field duplicate samples (TCLP - Lead) were sent to MRD for samples that had Total Lead > 500 ppm and were later analyzed for TCLP - Lead.

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE - SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
BAGLE PARK ACRES										
200 Allen										
SAN0200100C10/22/1993L	Total Lead	10/29/1993	710		mg/kg	5	Moisture Content	10/29/1993	16.3	%
SAN0200100C10/22/1993L	TCLP Lead	10/28/1993	0.37		mg/L	0.1				
SAN020010AB10/22/1993L	Total Lead	10/29/1993	956		mg/kg	5	Moisture Content	10/29/1993	18	%
SAN020010AB10/22/1993L	TCLP Lead	10/28/1993	0.15		mg/L	0.1				
SAN020010AB10/22/1993LD	Total Lead	10/29/1993	881		mg/kg	5	Moisture Content	10/29/1993	18.1	%
SAN020010AB10/22/1993LD	TCLP Lead	10/28/1993	0.31		mg/L	0.1				
SAN020020AB10/22/1993L	Total Lead	10/29/1993	336		mg/kg	5	Moisture Content	10/29/1993	22.8	%
SAN020020AB10/22/1993L	TCLP Lead	10/28/1993	0.14		mg/L	0.1				
SAN0200300C10/22/1993L	Total Lead	10/29/1993	648		mg/kg	5	Moisture Content	10/29/1993	20.8	%
SAN0200300C10/22/1993L	TCLP Lead	10/28/1993	0.15		mg/L	0.1				
SAN020030AB10/22/1993L	Total Lead	10/29/1993	554		mg/kg	5	Moisture Content	10/29/1993	21.9	%
SAN020030AB10/22/1993L	TCLP Lead	10/28/1993	0.17		mg/L	0.1				
SAN020040AB10/22/1993L	Total Lead	10/29/1993	101		mg/kg	0.1	Moisture Content	10/29/1993	21.5	%
SAN020040AB10/22/1993L	TCLP Lead	10/28/1993	<0.1		mg/L	0.1				
203 Allen										
SAN020310AB10/19/1993L	Total Lead	11/02/1993	101	J	mg/kg	5	Moisture Content	11/02/1993	18.9	%
SAN020320AB10/19/1993L	Total Lead	11/02/1993	1,640		mg/kg	5	Moisture Content	11/02/1993	24.7	%
SAN020320AB10/19/1993L	TCLP Lead		0.81		mg/L	0.1				
SAN0203300C10/19/1993L	Total Lead	11/02/1993	477		mg/kg	5	Moisture Content	11/02/1993	21.2	%
SAN020330AB10/19/1993L	Total Lead	11/02/1993	510		mg/kg	5	Moisture Content	11/02/1993	19.6	%
SAN020330AB10/19/1993L	TCLP Lead		<0.1		mg/L	0.1				
SAN020340AB10/19/1993L	Total Lead	11/02/1993	230		mg/kg	5	Moisture Content	11/02/1993	20.3	%
123 Booker										
SHK0123100A10/12/1993L	Total Lead	10/20/1993	9,220		mg/kg	5	Moisture Content	10/20/1993	10	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SBK0123100A10/12/1993L	TCLP Lead	12/07/1993	41		mg/l.	0.1				
SBK0123100B10/12/1993L	Total Lead	10/20/1993	24,500		mg/kg	5	Moisture Content	10/20/1993	11.5	%
SBK0123100B10/12/1993L	TCLP Lead	12/07/1993	1,687		mg/l.	0.1				
SBK0123100C10/12/1993L	Total Lead	10/20/1993	3,010		mg/kg	5	Moisture Content	10/20/1993	22.7	%
SBK0123100C10/12/1993L	TCLP Lead	12/07/1993	12		mg/l.	0.1				
SBK0123200A10/12/1993L	Total Lead	10/20/1993	6,820		mg/kg	5	Moisture Content	10/20/1993	15.2	%
SBK0123200A10/12/1993L	TCLP Lead	12/07/1993	9.52		mg/l.	0.1				
SBK0123200B10/12/1993L	Total Lead	10/20/1993	17,500		mg/kg	5	Moisture Content	10/20/1993	13.7	%
SBK0123200B10/12/1993L	TCLP Lead	12/07/1993	1,497		mg/l.	0.1				
SBK0123300A10/12/1993L	Total Lead	10/20/1993	873		mg/kg	5	Moisture Content	10/20/1993	19.8	%
SBK0123300A10/12/1993L	TCLP Lead	12/07/1993	0.14		mg/l.	0.1				
SBK0123300A10/12/1993L.D	Total Lead	10/20/1993	678		mg/kg	5	Moisture Content	10/20/1993	19	%
SBK0123300A10/12/1993L.D	TCLP Lead	12/07/1993	0.17		mg/l.	0.1				
SBK0123400A10/12/1993L	Total Lead	10/20/1993	1,730		mg/kg	5	Moisture Content	10/20/1993	10.6	%
SBK0123400A10/12/1993L	TCLP Lead	12/07/1993	0.88		mg/l.	0.1				
SBK0123400B10/12/1993L	Total Lead	10/20/1993	2,240		mg/kg	5	Moisture Content	10/20/1993	13	%
SBK0123400B10/12/1993L	TCLP Lead	12/07/1993	1.58		mg/l.	0.1				
104 Carver										
SCA0104100C10/13/1993L	Total Lead	10/21/1993	602		mg/kg	5	Moisture Content	10/21/1993	16	%
SCA0104100C10/13/1993L	TCLP Lead	12/07/1993	0.4		mg/l.	0.1				
SCA010410AB10/13/1993L	Total Lead	10/21/1993	4,200		mg/kg	5	Moisture Content	10/21/1993	11.7	%
SCA010410AB10/13/1993L	TCLP Lead	12/07/1993	5.8		mg/l.	0.1				
SCA0104200C10/13/1993L	Total Lead	10/21/1993	26,300		mg/kg	5	Moisture Content	10/21/1993	9.7	%
SCA0104200C10/13/1993L	TCLP Lead	12/07/1993	26.2		mg/l.	0.1				
SCA010420AB10/13/1993L	Total Lead	10/21/1993	1,070		mg/kg	5	Moisture Content	10/21/1993	8.3	%
SCA010420AB10/13/1993L	TCLP Lead	12/07/1993	<0.1		mg/l.	0.1				
SCA010420AB10/13/1993L.D	Total Lead	10/21/1993	1,040		mg/kg	5	Moisture Content	10/21/1993	7.3	%
SCA010420AB10/13/1993L.D	TCLP Lead	12/07/1993	<0.1		mg/l.	0.1				
SCA0104300C10/13/1993L	Total Lead	10/21/1993	2,560		mg/kg	5	Moisture Content	10/21/1993	18.1	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SCA0104300C10/13/1993L	TCLP Lead	12/07/1993	10.8		mg/L	0.1				
SCA010430AB10/13/1993L	Total Lead	10/21/1993	14,100		mg/kg	5	Moisture Content	10/21/1993	7.2	%
SCA010430AB10/13/1993L	TCLP Lead	12/07/1993	<0.1		mg/L	0.1				
SCA0104400C10/13/1993L	Total Lead	10/21/1993	5,450		mg/kg	5	Moisture Content	10/21/1993	8.4	%
SCA0104400C10/13/1993L	TCLP Lead	12/07/1993	16.1		mg/L	0.1				
SCA010440AB10/13/1993L	Total Lead	10/21/1993	1,400		mg/kg	5	Moisture Content	10/21/1993	3.5	%
SCA010440AB10/13/1993L	TCLP Lead	12/07/1993	2.31		mg/L	0.1				
SCA010450AB10/13/1993L	Total Lead	10/21/1993	7,710		mg/kg	5	Moisture Content	10/21/1993	17.6	%
SCA010450AB10/13/1993L	TCLP Lead	12/07/1993	4.39		mg/L	0.1				
SCA010460AB10/13/1993L	Total Lead	10/21/1993	985		mg/kg	5	Moisture Content	10/21/1993	13.5	%
SCA010460AB10/13/1993L	TCLP Lead	12/07/1993	<0.1		mg/L	0.1				
SCA0104700C10/13/1993L	Total Lead	10/21/1993	806		mg/kg	5	Moisture Content	10/21/1993	17.4	%
SCA0104700C10/13/1993L	TCLP Lead	12/07/1993	0.37		mg/L	0.1				
SCA010470AB10/13/1993L	Total Lead	10/21/1993	571		mg/kg	5	Moisture Content	10/21/1993	7.4	%
SCA010470AB10/13/1993L	TCLP Lead	12/07/1993	0.55		mg/L	0.1				
SCA0104800C10/13/1993L	Total Lead	10/21/1993	253		mg/kg	5	Moisture Content	10/21/1993	24.2	%
SCA010480AB10/13/1993L	Total Lead	10/21/1993	103		mg/kg	5	Moisture Content	10/21/1993	18.5	%
126 Carver										
SCA0126100A10/13/1993L	Total Lead	10/21/1993	174		mg/kg	5	Moisture Content	10/21/1993	12.6	%
SCA0126200A10/13/1993L	Total Lead	10/21/1993	142		mg/kg	5	Moisture Content	10/21/1993	14.4	%
212 Carver										
SCA0212100A10/13/1993L	Total Lead	10/21/1993	40		mg/kg	5	Moisture Content	10/21/1993	21.2	%
SCA0212200A10/13/1993L	Total Lead	10/21/1993	85		mg/kg	5	Moisture Content	10/21/1993	12.3	%
SCA0212300A10/13/1993L	Total Lead	10/21/1993	324		mg/kg	5	Moisture Content	10/21/1993	24.2	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SCA0212400A10/13/1993L	Total Lead	10/21/1993	1,990		mg/kg	5	Moisture Content	10/21/1993	26.3	%
SCA0212400A10/13/1993L	TCLP Lead	12/07/1993	0.59		mg/L	0.1				
101 Harrison										
SHA0101100A10/13/1993L	Total Lead	10/21/1993	95.2		mg/kg	5	Moisture Content	10/21/1993	15.8	%
SHA0101200A10/13/1993L	Total Lead	10/21/1993	778		mg/kg	5	Moisture Content	10/21/1993	13.8	%
SHA0101200A10/13/1993L	TCLP Lead	12/07/1993	<0.1		mg/L	0.1				
SHA0101200B10/13/1993L	Total Lead	10/21/1993	266		mg/kg	5	Moisture Content	10/21/1993	14.5	%
SHA0101300A10/13/1993L	Total Lead	10/21/1993	81.4		mg/kg	5	Moisture Content	10/21/1993	20.8	%
SHA0101300A10/13/1993L.D	Total Lead	10/21/1993	129		mg/kg	5	Moisture Content	10/21/1993	20.1	%
SHA0101400A10/13/1993L	Total Lead	10/21/1993	165		mg/kg	5	Moisture Content	10/21/1993	24.6	%
SHA0101400A10/13/1993L.D	Total Lead	10/21/1993	104		mg/kg	5	Moisture Content	10/21/1993	28.1	%
95 Hill										
SHI0095100A10/12/1993L	Total Lead	10/20/1993	98.2		mg/kg	5	Moisture Content	10/20/1993	18.4	%
SHI0095400A10/12/1993L	Total Lead	10/20/1993	101		mg/kg	5	Moisture Content	10/20/1993	19.5	%
206 Hill										
SHI0206100A10/13/1993L	Total Lead	10/21/1993	180		mg/kg	5	Moisture Content	10/21/1993	17.9	%
SHI0206200A10/13/1993L	Total Lead	10/21/1993	46.7		mg/kg	5	Moisture Content	10/21/1993	13.5	%
SHI0206300A10/13/1993L	Total Lead	10/21/1993	73.9		mg/kg	5	Moisture Content	10/21/1993	19.7	%
SHI0206400A10/13/1993L	Total Lead	10/21/1993	302		mg/kg	5	Moisture Content	10/21/1993	16.1	%
209 Hill										
SHI0209100A10/12/1993L	Total Lead	10/20/1993	173	J	mg/kg	5	Moisture Content	10/20/1993	21	%
SHI0209100B10/12/1993L	Total Lead	10/20/1993	172		mg/kg	5	Moisture Content	10/20/1993	9.7	%
SHI0209200A10/12/1993L	Total Lead	10/20/1993	1,690		mg/kg	5	Moisture Content	10/20/1993	33.1	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SHI0209200A10/12/1993L	TCLP Lead	12/07/1993	<0.1		mg/l.	0.1				
SHI0209300A10/12/1993L	Total Lead	10/20/1993	328		mg/kg	5	Moisture Content	10/20/1993	30.2	%
SHI0209400A10/12/1993L	Total Lead	10/20/1993	159		mg/kg	5	Moisture Content	10/20/1993	18	%
211 Hill										
SHI0211100A10/08/1993L	Total Lead	10/20/1993	214		mg/kg	5	Moisture Content	10/20/1993	15.1	%
SHI0211100B10/08/1993L	Total Lead	10/20/1993	70.2		mg/kg	5	Moisture Content	10/20/1993	16.7	%
SHI0211200A10/08/1993L	Total Lead	10/20/1993	43.9		mg/kg	5	Moisture Content	10/20/1993	14.6	%
SHI0211200B10/08/1993L	Total Lead	10/20/1993	74.6		mg/kg	5	Moisture Content	10/20/1993	17.3	%
SHI0211300A10/08/1993L	Total Lead	10/20/1993	1,370		mg/kg	5	Moisture Content	10/20/1993	17.7	%
SHI0211300A10/08/1993L	TCLP Lead	12/07/1993	1.53		mg/l.	0.1				
SHI0211300B10/08/1993L	Total Lead	10/20/1993	941		mg/kg	5	Moisture Content	10/20/1993	18.6	%
SHI0211300B10/08/1993L	TCLP Lead	12/07/1993	0.4		mg/l.	0.1				
SHI0211400C10/08/1993L	Total Lead	10/20/1993	121		mg/kg	5	Moisture Content	10/20/1993	21.1	%
SHI021140AB10/08/1993L	Total Lead	10/20/1993	1,800		mg/kg	5	Moisture Content	10/20/1993	17.1	%
SHI021140AB10/08/1993L	TCLP Lead	12/07/1993	1.4		mg/l.	0.1				
212 Hill										
SHI0212100A10/08/1993L	Total Lead	10/20/1993	114		mg/kg	5	Moisture Content	10/20/1993	15.2	%
SHI0212200A10/08/1993L	Total Lead	10/20/1993	260		mg/kg	5	Moisture Content	10/20/1993	24	%
SHI0212200B10/08/1993L	Total Lead	10/20/1993	248		mg/kg	5	Moisture Content	10/20/1993	17.4	%
SHI0212300A10/08/1993L	Total Lead	10/20/1993	211		mg/kg	5	Moisture Content	10/20/1993	18.3	%
SHI0212400A10/08/1993L	Total Lead	10/20/1993	249		mg/kg	5	Moisture Content	10/20/1993	21.8	%
202 Terry										
STE0202100A10/12/1993L	Total Lead	10/20/1993	492		mg/kg	5	Moisture Content	10/20/1993	40.6	%
STE0202100A10/12/1993L	TCLP Lead	12/07/1993	0.32		mg/l.	0.1				

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
STE0202300A10/12/1993L	Total Lead	10/20/1993	424		mg/kg	5	Moisture Content	10/20/1993	8.4	%
STE0202300B10/12/1993L	Total Lead	10/20/1993	192		mg/kg	5	Moisture Content	10/20/1993	9.9	%
STE0202400A10/12/1993L	Total Lead	10/20/1993	95.5		mg/kg	5	Moisture Content	10/20/1993	18.2	%
204 Terry										
STE0204100A10/12/1993L	Total Lead	10/20/1993	1,390		mg/kg	5	Moisture Content	10/20/1993	35.4	%
STE0204100A10/12/1993L	TCLP Lead	12/07/1993	0.54		mg/l.	0.1				
STE0204100B10/12/1993L	Total Lead	10/20/1993	2,740		mg/kg	5	Moisture Content	10/20/1993	21.1	%
STE0204100B10/12/1993L	TCLP Lead	12/07/1993	0.85		mg/l.	0.1				
STE0204300A10/12/1993L	Total Lead	10/20/1993	87.7		mg/kg	5	Moisture Content	10/20/1993	24.9	%
STE0204300B10/12/1993L	Total Lead	10/20/1993	4,600		mg/kg	5	Moisture Content	10/20/1993	36	%
STE0204300C10/12/1993L	TCLP Lead	12/07/1993	6.58		mg/l.	0.1				
210 Watson										
SWN0210100A10/07/1993L	Total Lead	10/20/1993	501		mg/kg	5	Moisture Content	10/20/1993	11.6	%
SWN0210100A10/07/1993L	TCLP Lead	12/07/1993	0.2		mg/l.	0.1				
SWN0210200A10/07/1993L	Total Lead	10/20/1993	23,000		mg/kg	5	Moisture Content	10/20/1993	6.7	%
SWN0210200A10/07/1993L	TCLP Lead	12/07/1993	682		mg/l.	0.1				
SWN0210300A10/07/1993L	Total Lead	10/20/1993	1,600		mg/kg	5	Moisture Content	10/20/1993	9.3	%
SWN0210300A10/07/1993L	TCLP Lead	12/07/1993	1.52		mg/l.	0.1				
SWN0210400A10/07/1993L	Total Lead	10/20/1993	336		mg/kg	5	Moisture Content	10/20/1993	13.4	%
212 Watson										
SWN0212100A10/06/1993L	Total Lead	10/20/1993	146		mg/kg	5	Moisture Content	10/20/1993	21.9	%
SWN0212200A10/06/1993L	Total Lead	10/20/1993	712		mg/kg	5	Moisture Content	10/20/1993	12.8	%
SWN0212200A10/06/1993L	TCLP Lead		0.2		mg/l.	0.1				
SWN0212400A10/06/1993L	Total Lead	10/20/1993	74.5		mg/kg	5	Moisture Content	10/20/1993	9	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
213 Watson SWN0213200A10/08/1993L	Total Lead	10/20/1993	239	J	mg/kg	5	Moisture Content	10/20/1993	22.4	%
SWN0213300A10/08/1993L	Total Lead	10/20/1993	58.8		mg/kg	5	Moisture Content	10/20/1993	18.4	%
SWN0213400A10/08/1993L	Total Lead	10/20/1993	170		mg/kg	5	Moisture Content	10/20/1993	23.1	%
SWN0213400A10/08/1993LD	Total Lead	10/20/1993	115		mg/kg	5	Moisture Content	10/20/1993	18.9	%
SWN0213400B10/08/1993L	Total Lead	10/20/1993	140		mg/kg	5	Moisture Content	10/20/1993	21.6	%
214 Watson SWN0214200A10/07/1993L	Total Lead	10/20/1993	96.5		mg/kg	5	Moisture Content	10/20/1993	10.3	%
SWN0214400A10/07/1993L	Total Lead	10/20/1993	2,120		mg/kg	5	Moisture Content	10/20/1993	10.4	%
SWN0214400A10/07/1993L	TCLP Lead	12/07/1993	2.71		mg/l.	0.1				
SWN0214400B10/07/1993L	Total Lead	10/20/1993	258		mg/kg	5	Moisture Content	10/20/1993	17	%
215 Watson SWN0215100A10/07/1993L	Total Lead	10/20/1993	532		mg/kg	5	Moisture Content	10/20/1993	15.5	%
SWN0215100A10/07/1993L	TCLP Lead	12/07/1993	<0.1		mg/l.	0.1				
SWN0215200A10/07/1993L	Total Lead	10/20/1993	1,120		mg/kg	5	Moisture Content	10/20/1993	11.3	%
SWN0215200A10/07/1993L	TCLP Lead	12/07/1993	0.3		mg/l.	0.1				
SWN0215300A10/07/1993L	Total Lead	10/20/1993	422		mg/kg	5	Moisture Content	10/20/1993	11.8	%
SWN0215400A10/07/1993L	Total Lead	10/20/1993	206		mg/kg	5	Moisture Content	10/20/1993	20.3	%
217 Watson SWN0217100A10/07/1993L	Total Lead	10/20/1993	415		mg/kg	5	Moisture Content	10/20/1993	17	%
SWN0217100B10/07/1993L	Total Lead	10/20/1993	146		mg/kg	5	Moisture Content	10/20/1993	12.3	%
SWN0217100C10/07/1993L	Total Lead	10/20/1993	305		mg/kg	5	Moisture Content	10/20/1993	22.5	%
SWN0217200A10/07/1993L	Total Lead	10/20/1993	351		mg/kg	5	Moisture Content	10/20/1993	22.8	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SWN0217300A10/07/1993L	Total Lead	10/20/1993	73.3		mg/kg	5	Moisture Content	10/20/1993	21.3	%
SWN0217400A10/07/1993L	Total Lead	10/20/1993	241		mg/kg	5	Moisture Content	10/20/1993	16.9	%
Watson Alley										
SOR2001100D09/30/1993L	Total Lead	10/11/1993	45.7		mg/kg	5	Moisture Content	10/11/1993	22.1	%
SOR200110AC09/30/1993L	Total Lead	10/11/1993	177		mg/kg	5	Moisture Content	10/11/1993	12.1	%
SOR2001200J09/30/1993L	Total Lead	10/11/1993	198		mg/kg	5	Moisture Content	10/11/1993	13.7	%
SOR2001200K09/30/1993L	Total Lead	10/11/1993	17.7		mg/kg	5	Moisture Content	10/11/1993	23.3	%
SOR2001300D09/30/1993L	Total Lead	10/11/1993	64.8		mg/kg	5	Moisture Content	10/11/1993	20.8	%
SOR200130AC09/30/1993L	Total Lead	10/11/1993	172		mg/kg	5	Moisture Content	10/11/1993	14.2	%
SOR2001400D09/30/1993L	Total Lead	10/11/1993	6.5		mg/kg	5	Moisture Content	10/11/1993	7.7	%
SOR200140AC09/30/1993L	Total Lead	10/11/1993	18.1		mg/kg	5	Moisture Content	10/11/1993	9.1	%
SOR2001500D09/30/1993L	Total Lead	10/11/1993	34		mg/kg	5	Moisture Content	10/11/1993	17.8	%
SOR200150AC09/30/1993L	Total Lead	10/11/1993	3,422		mg/kg	5	Moisture Content	10/11/1993	15.6	%
SOR200150AC09/30/1993L	TCLP Lead	11/23/1993	2.55		mg/L	0.1				
SOR2001600D09/30/1993L	Total Lead	10/11/1993	63.6		mg/kg	5	Moisture Content	10/11/1993	19.8	%
SOR200160AC09/30/1993L	Total Lead	10/11/1993	15,250		mg/kg	5	Moisture Content	10/11/1993	19.3	%
SOR200160AC09/30/1993L	TCLP Lead	11/23/1993	10.52		mg/L	0.1				
SOR2001700D09/30/1993L	Total Lead	10/11/1993	14.4		mg/kg	5	Moisture Content	10/11/1993	21.5	%
SOR200170AC09/30/1993L	Total Lead	10/11/1993	110		mg/kg	5	Moisture Content	10/11/1993	7.3	%
SOR2001800D09/30/1993L	Total Lead	10/11/1993	11.4		mg/kg	5	Moisture Content	10/11/1993	18.6	%
SOR200180AC09/30/1993L	Total Lead	10/11/1993	159		mg/kg	5	Moisture Content	10/11/1993	9	%
SOR2001900D09/30/1993L	Total Lead	10/11/1993	21.9		mg/kg	5	Moisture Content	10/11/1993	21.7	%
SOR200190AC09/30/1993L	Total Lead	10/11/1993	659		mg/kg	5	Moisture Content	10/11/1993	6.5	%
SOR200190AC09/30/1993L	TCLP Lead	11/23/1993	<0.1		mg/L	0.1				

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE - SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
VENICE ALLEYS										
Alley No. 2										
SVE2002100J09/24/1993L	Total Lead	10/01/1993	518		mg/kg	5	Moisture Content	10/01/1993	18.2	%
SVE2002100J09/24/1993L	TCLP Lead	10/04/1993	<0.1		mg/l	0.1				
SVE2002200K09/24/1993L	Total Lead	10/01/1993	145		mg/kg	5	Moisture Content	10/01/1993	22.7	%
SVE2002200K09/24/1993L	TCLP Lead	10/04/1993	<0.1		mg/l	0.1				
SVE2002300J09/24/1993L	Total Lead	10/01/1993	479		mg/kg	5	Moisture Content	10/01/1993	8.6	%
SVE2002300J09/24/1993L	TCLP Lead	10/04/1993	2.16		mg/l	0.1				
SVE2002400J09/24/1993L	Total Lead	10/01/1993	6,040		mg/kg	5	Moisture Content	10/01/1993	12.5	%
SVE2002400J09/24/1993L	TCLP Lead	10/04/1993	178		mg/l	0.1				
Alley No. 3										
SVE2003100A09/21/1993L	Total Lead	09/30/1993	902		mg/kg	5	Moisture Content	09/30/1993	5.3	%
SVE2003100A09/21/1993L	TCLP Lead	11/05/1993	0.31		mg/l	0.1				
SVE2003200A09/21/1993L	Total Lead	09/30/1993	150		mg/kg	5	Moisture Content	09/30/1993	5.2	%
SVE2003300A09/21/1993L	Total Lead	09/30/1993	183		mg/kg	5	Moisture Content	09/30/1993	4.4	%
SVE2003300A09/21/1993L.D	Total Lead	09/30/1993	213		mg/kg	5	Moisture Content	09/30/1993	6.4	%
SVE2003400A09/21/1993L	Total Lead	09/30/1993	352		mg/kg	5	Moisture Content	09/30/1993	10.4	%
Alley No. 4										
SVE2004100A09/24/1993L	Total Lead	10/01/1993	35.5		mg/kg	5	Moisture Content	10/01/1993	4.4	%
SVE2004200A09/24/1993L	Total Lead	10/01/1993	46.3		mg/kg	5	Moisture Content	10/01/1993	6.8	%
SVE2004300A09/24/1993L	Total Lead	10/01/1993	122		mg/kg	5	Moisture Content	10/01/1993	7.8	%
SVE2004400A09/24/1993L	Total Lead	10/01/1993	436		mg/kg	5	Moisture Content	10/01/1993	12.1	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
Alley No. 5										
SVE2005100A09/24/1993L	Total Lead	10/01/1993	52.7		mg/kg	5	Moisture Content	10/01/1993	7.1	%
SVE2005200A09/24/1993L	Total Lead	10/01/1993	1,040		mg/kg	5	Moisture Content	10/01/1993	9	%
SVE2005200A09/24/1993L	TCLP Lead	11/23/1993	0.21		mg/l.	0.1				
SVE2005200A09/24/1993L.D	Total Lead	10/01/1993	1,040		mg/kg	5	Moisture Content	10/01/1993	8.7	%
SVE2005200A09/24/1993L.D	TCLP Lead	11/23/1993	0.1		mg/l.	0.1				
SVE2005300A09/24/1993L	Total Lead	10/01/1993	180		mg/kg	5	Moisture Content	10/01/1993	7.5	%
SVE2005400A09/24/1993L	Total Lead	10/01/1993	62.6		mg/kg	5	Moisture Content	10/01/1993	6.9	%
Alley No. 7										
SVE2007100J09/27/1993L	Total Lead	10/06/1993	569		mg/kg	5	Moisture Content	10/06/1993	9.9	%
SVE2007100J09/27/1993L	TCLP Lead	10/04/1993	0.56		mg/l.	0.1				
SVE2007200J09/27/1993L	Total Lead	10/06/1993	2,948		mg/kg	5	Moisture Content	10/06/1993	15.5	%
SVE2007200J09/27/1993L	TCLP Lead	10/04/1993	1.57		mg/l.	0.1				
SVE2007300J09/27/1993L	Total Lead	10/06/1993	2,373		mg/kg	5	Moisture Content	10/06/1993	16.4	%
SVE2007300J09/27/1993L	TCLP Lead	10/04/1993	16.1		mg/l.	0.1				
SVE2007400J09/27/1993L	Total Lead	10/06/1993	643		mg/kg	5	Moisture Content	10/06/1993	13.2	%
SVE2007400J09/27/1993L	TCLP Lead	10/04/1993	0.65		mg/l.	0.1				
Alley No. 9										
SVE2009100A09/24/1993L	Total Lead	10/01/1993	444		mg/kg	5	Moisture Content	10/01/1993	8.4	%
SVE2009200A09/24/1993L	Total Lead	10/01/1993	271		mg/kg	5	Moisture Content	10/01/1993	10.7	%
SVE2009300A09/24/1993L	Total Lead	10/01/1993	2,120		mg/kg	5	Moisture Content	10/01/1993	12.3	%
SVE2009300A09/24/1993L	TCLP Lead	11/23/1993	0.45		mg/l.	0.1				
SVE2009400A09/24/1993L	Total Lead	10/01/1993	115		mg/kg	5	Moisture Content	10/01/1993	7.2	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
Alley No. 10										
SVE2010100J09/28/1993L	Total Lead	10/06/1993	459		mg/kg	5	Moisture Content	10/06/1993	12	%
SVE2010100J09/28/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2010200J09/28/1993L	Total Lead	10/06/1993	1,160		mg/kg	5	Moisture Content	10/06/1993	19.1	%
SVE2010200J09/28/1993L	TCLP Lead	10/11/1993	0.53		mg/l.	0.1				
SVE2010300J09/28/1993L	Total Lead	10/06/1993	1,670		mg/kg	5	Moisture Content	10/06/1993	14.4	%
SVE2010300J09/28/1993L	TCLP Lead	10/11/1993	1.18		mg/l.	0.1				
SVE2010400J09/29/1993L	Total Lead	10/06/1993	534		mg/kg	5	Moisture Content	10/06/1993	22.3	%
SVE2010400J09/29/1993L	TCLP Lead	10/11/1993	1.03		mg/l.	0.1				
Alley No. 11										
SVE2011100J09/27/1993L	Total Lead	10/06/1993	280	J	mg/kg	5	Moisture Content	10/06/1993	10.5	%
SVE2011100J09/27/1993L	TCLP Lead	10/04/1993	<0.1		mg/l.	0.1				
SVE2011200J09/27/1993L	Total Lead	10/06/1993	180		mg/kg	5	Moisture Content	10/06/1993	23.2	%
SVE2011200J09/27/1993L	TCLP Lead	10/04/1993	<0.1		mg/l.	0.1				
SVE2011300J09/27/1993L	Total Lead	10/06/1993	265		mg/kg	5	Moisture Content	10/06/1993	17.7	%
SVE2011300J09/27/1993L	TCLP Lead	10/04/1993	<0.1		mg/l.	0.1				
SVE2011300J09/27/1993L.D	Total Lead	10/06/1993	250		mg/kg	5	Moisture Content	10/06/1993	16.5	%
SVE2011300J09/27/1993L.D	TCLP Lead	10/04/1993	<0.1		mg/l.	0.1				
SVE2011400J09/27/1993L	Total Lead	10/06/1993	256		mg/kg	5	Moisture Content	10/06/1993	14.4	%
SVE2011400J09/27/1993L	TCLP Lead	10/04/1993	0.22		mg/l.	0.1				
Alley No. 14										
SVE2014100J09/27/1993L	Total Lead	10/06/1993	850		mg/kg	5	Moisture Content	10/06/1993	20	%
SVE2014100J09/27/1993L	TCLP Lead	10/04/1993	204		mg/l.	0.1				
SVE2014200J09/27/1993L	Total Lead	10/06/1993	4,081		mg/kg	5	Moisture Content	10/06/1993	19.6	%
SVE2014200J09/27/1993L	TCLP Lead	10/04/1993	4.52		mg/l.	0.1				

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2014300J09/27/1993L	Total Lead	10/06/1993	1,262		mg/kg	5	Moisture Content	10/06/1993	16.8	%
SVE2014300J09/27/1993L	TCLP Lead	10/04/1993	0.25		mg/l.	0.1				
SVE2014400J09/27/1993L	Total Lead	10/06/1993	2,384		mg/kg	5	Moisture Content	10/06/1993	21.4	%
SVE2014400J09/27/1993L	TCLP Lead	10/04/1993	2.23		mg/l.	0.1				
Alley No. 15										
SVE2015100J09/28/1993L	Total Lead	10/06/1993	2,420		mg/kg	5	Moisture Content	10/06/1993	16.3	%
SVE2015100J09/28/1993L	TCLP Lead	10/11/1993	4.2		mg/l.	0.1				
SVE2015200J09/28/1993L	Total Lead	10/06/1993	860		mg/kg	5	Moisture Content	10/06/1993	18.4	%
SVE2015200J09/28/1993L	TCLP Lead	10/11/1993	0.25		mg/l.	0.1				
SVE2015300K09/28/1993L	Total Lead	10/06/1993	486		mg/kg	5	Moisture Content	10/06/1993	14.1	%
SVE2015300K09/28/1993L	TCLP Lead	10/11/1993	0.34		mg/l.	0.1				
SVE2015400J09/28/1993L	Total Lead	10/06/1993	1,730		mg/kg	5	Moisture Content	10/06/1993	7.7	%
SVE2015400J09/28/1993L	TCLP Lead	10/11/1993	2.41		mg/l.	0.1				
Alley No. 18										
SVE2018100J09/28/1993L	Total Lead	10/06/1993	67.1		mg/kg	5	Moisture Content	10/06/1993	16.6	%
SVE2018100J09/28/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2018200J09/28/1993L	Total Lead	10/06/1993	2,900		mg/kg	5	Moisture Content	10/06/1993	17.3	%
SVE2018200J09/28/1993L	TCLP Lead	10/11/1993	5.15		mg/l.	0.1				
SVE2018300J09/28/1993L	Total Lead	10/06/1993	48.5		mg/kg	5	Moisture Content	10/06/1993	21.1	%
SVE2018300J09/28/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2018400J09/28/1993L	Total Lead	10/06/1993	2,200		mg/kg	5	Moisture Content	10/06/1993	18.3	%
SVE2018400J09/28/1993L	TCLP Lead	10/11/1993	0.12		mg/l.	0.1				
Alley No. 20										
SVE2020100A09/24/1993L	Total Lead	10/01/1993	261		mg/kg	5	Moisture Content	10/01/1993	10.6	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2020200A09/24/1993L	Total Lead	10/01/1993	145		mg/kg	5	Moisture Content	10/01/1993	6.7	%
SVE2020300A09/24/1993L	Total Lead	10/01/1993	81.5		mg/kg	5	Moisture Content	10/01/1993	8	%
SVE2020400A09/24/1993L	Total Lead	10/01/1993	102		mg/kg	5	Moisture Content	10/01/1993	8.6	%
Alley No. 22										
SVE2022100J09/28/1993L	Total Lead	10/06/1993	2,620		mg/kg	5	Moisture Content	10/06/1993	10.6	%
SVE2022100J09/28/1993L	TCLP Lead	10/11/1993	0.1		mg/l.	0.1				
SVE2022200J09/28/1993L	Total Lead	10/06/1993	1,340		mg/kg	5	Moisture Content	10/06/1993	14.7	%
SVE2022200J09/28/1993L	TCLP Lead	10/11/1993	1.81		mg/l.	0.1				
SVE2022300J09/28/1993L	Total Lead	10/06/1993	1,060		mg/kg	5	Moisture Content	10/06/1993	14.1	%
SVE2022300J09/28/1993L	TCLP Lead	10/11/1993	0.26		mg/l.	0.1				
SVE2022300J09/28/1993L.D	Total Lead	10/06/1993	858		mg/kg	5	Moisture Content	10/06/1993	16.9	%
SVE2022300J09/28/1993L.D	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2022400J09/28/1993L	Total Lead	10/06/1993	3,560		mg/kg	5	Moisture Content	10/06/1993	10.4	%
SVE2022400J09/28/1993L	TCLP Lead	10/11/1993	22.5		mg/l.	0.1				
Alley No. 23										
SVE2023100A09/24/1993L	Total Lead	10/01/1993	291		mg/kg	5	Moisture Content	10/01/1993	7.2	%
SVE2023200A09/24/1993L	Total Lead	10/01/1993	104		mg/kg	5	Moisture Content	10/01/1993	8.6	%
SVE2023300A09/24/1993L	Total Lead	10/01/1993	35.1		mg/kg	5	Moisture Content	10/01/1993	4.2	%
SVE2023400A09/24/1993L	Total Lead	10/01/1993	48.2		mg/kg	5	Moisture Content	10/01/1993	6	%
Alley No. 24										
SVE2024100A09/24/1993L	Total Lead	10/01/1993	117		mg/kg	5	Moisture Content	10/01/1993	9.4	%
SVE2024100A09/24/1993L.D	Total Lead	10/01/1993	134		mg/kg	5	Moisture Content	10/01/1993	5.8	%
SVE2024200A09/24/1993L	Total Lead	10/01/1993	110		mg/kg	5	Moisture Content	10/01/1993	6	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2024300A09/24/1993L	Total Lead	10/01/1993	99.6		mg/kg	5	Moisture Content	10/01/1993	6.8	%
SVE2024400A09/24/1993L	Total Lead	10/01/1993	186		mg/kg	5	Moisture Content	10/01/1993	8.2	%
Alley No. 25										
SVE2025100J09/29/1993L	Total Lead	10/06/1993	228		mg/kg	5	Moisture Content	10/06/1993	9.8	%
SVE2025100J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2025200J09/29/1993L	Total Lead	10/06/1993	833		mg/kg	5	Moisture Content	10/06/1993	16.2	%
SVE2025200J09/29/1993L	TCLP Lead	10/11/1993	2.48		mg/l.	0.1				
SVE2025300J09/29/1993L	Total Lead	10/06/1993	11,900		mg/kg	5	Moisture Content	10/06/1993	9.9	%
SVE2025300J09/29/1993L	TCLP Lead	10/11/1993	0.32		mg/l.	0.1				
SVE2025400J09/29/1993L	Total Lead	10/06/1993	613		mg/kg	5	Moisture Content	10/06/1993	18.2	%
SVE2025400J09/29/1993L	TCLP Lead	10/11/1993	0.34		mg/l.	0.1				
Alley No. 26										
SVE2026100J09/29/1993L	Total Lead	10/06/1993	372		mg/kg	5	Moisture Content	10/06/1993	14.6	%
SVE2026100J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2026200J09/29/1993L	Total Lead	10/06/1993	541		mg/kg	5	Moisture Content	10/06/1993	14.5	%
SVE2026200J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2026300J09/29/1993L	Total Lead	10/06/1993	288		mg/kg	5	Moisture Content	10/06/1993	13.8	%
SVE2026300J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2026300J09/29/1993L.D	Total Lead	10/06/1993	277		mg/kg	5	Moisture Content	10/06/1993	14.2	%
SVE2026300J09/29/1993L.D	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
SVE2026400J09/29/1993L	Total Lead	10/06/1993	194		mg/kg	5	Moisture Content	10/06/1993	12.1	%
SVE2026400J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/l.	0.1				
Alley No. 29										
SVE2029100J09/29/1993L	Total Lead	10/06/1993	759		mg/kg	5	Moisture Content	10/06/1993	12.7	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE - SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2029100J09/29/1993L	TCLP Lead	10/11/1993	0.68		mg/L	0.1				
SVE2029200J09/29/1993L	Total Lead	10/06/1993	183		mg/kg	5	Moisture Content	10/06/1993	10.8	%
SVE2029200J09/29/1993L	TCLP Lead	10/11/1993	0.14		mg/L	0.1				
SVE2029300J09/29/1993L	Total Lead	10/06/1993	199		mg/kg	5	Moisture Content	10/06/1993	18.5	%
SVE2029300J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/L	0.1				
SVE2029400J09/29/1993L	Total Lead	10/06/1993	1,680		mg/kg	5	Moisture Content	10/06/1993	16.8	%
SVE2029400J09/29/1993L	TCLP Lead	10/11/1993	0.58		mg/L	0.1				
Alley No. 30										
SVE2030100J09/29/1993L	Total Lead	10/06/1993	310		mg/kg	5	Moisture Content	10/06/1993	15.9	%
SVE2030100J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/L	0.1				
SVE2030200J09/29/1993L	Total Lead	10/06/1993	3,170		mg/kg	5	Moisture Content	10/06/1993	15.6	%
SVE2030200J09/29/1993L	TCLP Lead	10/11/1993	17.4		mg/L	0.1				
SVE2030300J09/29/1993L	Total Lead	10/06/1993	68		mg/kg	5	Moisture Content	10/06/1993	11.4	%
SVE2030300J09/29/1993L	TCLP Lead	10/11/1993	<0.1		mg/L	0.1				
SVE2030400J09/29/1993L	Total Lead	10/06/1993	392		mg/kg	5	Moisture Content	10/06/1993	19.6	%
SVE2030400J09/29/1993L	TCLP Lead	10/11/1993	0.1		mg/L	0.1				
Alley No. 34										
SVE2034100A09/23/1993L	Total Lead	09/30/1993	165		mg/kg	5	Moisture Content	09/30/1993	11.5	%
SVE2034200A09/23/1993L	Total Lead	09/30/1993	78.5		mg/kg	5	Moisture Content	09/30/1993	8.6	%
SVE2034300A09/23/1993L	Total Lead	09/30/1993	1,820		mg/kg	5	Moisture Content	09/30/1993	7.1	%
SVE2034300A09/23/1993L	TCLP Lead	11/05/1993	2.26		mg/L	0.1				
SVE2034300A09/23/1993L.D	Total Lead	09/30/1993	2,060		mg/kg	5	Moisture Content	09/30/1993	6.9	%
SVE2034300A09/23/1993L.D	TCLP Lead	11/05/1993	0.39		mg/L	0.1				
SVE2034400A09/23/1993L	Total Lead	09/30/1993	285		mg/kg	5	Moisture Content	09/30/1993	8.1	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
Alley No. 35										
SVE2035100A09/23/1993L	Total Lead	09/30/1993	1,450		mg/kg	5	Moisture Content	09/30/1993	12.7	%
SVE2035100A09/23/1993L	TCLP Lead	11/05/1993	4.35		mg/L	0.1				
SVE2035200A09/23/1993L	Total Lead	09/30/1993	806		mg/kg	5	Moisture Content	09/30/1993	17.7	%
SVE2035200A09/23/1993L	TCLP Lead	11/05/1993	0.29		mg/L	0.1				
SVE2035300A09/23/1993L	Total Lead	09/30/1993	740		mg/kg	5	Moisture Content	09/30/1993	8.7	%
SVE2035300A09/23/1993L	TCLP Lead	11/05/1993	<0.1		mg/L	0.1				
SVE2035400A09/23/1993L	Total Lead	09/30/1993	422		mg/kg	5	Moisture Content	09/30/1993	9.6	%
Alley No. 36										
SVE203610A09/23/1993L	Total Lead	09/30/1993	726		mg/kg	5	Moisture Content	09/30/1993	10.3	%
SVE203610A09/23/1993L	TCLP Lead	09/30/1993	0.74		mg/L	0.1				
SVE203620AB09/23/1993L	Total Lead	09/30/1993	3,600		mg/kg	5	Moisture Content	09/30/1993	10.3	%
SVE203620AB09/23/1993L	TCLP Lead	09/30/1993	10.82		mg/L	0.1				
SVE2036300J09/24/1993L	Total Lead	10/01/1993	169		mg/kg	5	Moisture Content	10/01/1993	12.9	%
SVE2036300J09/24/1993L	TCLP Lead	10/04/1993	<0.1		mg/L	0.1				
SVE2036400J09/24/1993L	Total Lead	10/01/1993	146		mg/kg	5	Moisture Content	10/01/1993	8.8	%
SVE2036400J09/24/1993L	TCLP Lead	10/04/1993	0.15		mg/L	0.1				
Alley No. 37										
SVE2037100A09/23/1993L	Total Lead	09/30/1993	102		mg/kg	5	Moisture Content	09/30/1993	8.2	%
SVE2037200A09/23/1993L	Total Lead	09/30/1993	595		mg/kg	5	Moisture Content	09/30/1993	21.3	%
SVE2037200A09/23/1993L	TCLP Lead	11/05/1993	<0.1		mg/L	0.1				
SVE2037300A09/23/1993L	Total Lead	09/30/1993	385		mg/kg	5	Moisture Content	09/30/1993	17	%
SVE2037400A09/23/1993L	Total Lead	09/30/1993	186		mg/kg	5	Moisture Content	09/30/1993	12.9	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
Alley No. 39										
SVE2039100J09/23/1993L	Total Lead	09/30/1993	421		mg/kg	5	Moisture Content	09/30/1993	14.2	%
SVE2039100J09/23/1993L	TCLP Lead	09/30/1993	0.24		mg/l.	0.1				
SVE2039200J09/23/1993L	Total Lead	09/30/1993	632		mg/kg	5	Moisture Content	09/30/1993	16.5	%
SVE2039200J09/23/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE2039300J09/23/1993L	Total Lead	09/30/1993	1,280		mg/kg	5	Moisture Content	09/30/1993	16	%
SVE2039300J09/23/1993L	TCLP Lead	09/30/1993	3.22		mg/l.	0.1				
SVE2039400J09/24/1993L	Total Lead	10/01/1993	6,360		mg/kg	5	Moisture Content	10/01/1993	11.3	%
SVE2039400J09/24/1993L	TCLP Lead	10/04/1993	0.17		mg/l.	0.1				
Alley No. 40										
SVE2040100A09/23/1993L	Total Lead	09/30/1993	144		mg/kg	5	Moisture Content	09/30/1993	9.6	%
SVE2040200A09/23/1993L	Total Lead	09/30/1993	34.7		mg/kg	5	Moisture Content	09/30/1993	9.4	%
SVE2040300A09/23/1993L	Total Lead	09/30/1993	25.8		mg/kg	5	Moisture Content	09/30/1993	10.4	%
SVE2040400A09/23/1993L	Total Lead	09/30/1993	902		mg/kg	5	Moisture Content	09/30/1993	10.9	%
SVE2040400A09/23/1993L	TCLP Lead	11/05/1993	0.15		mg/l.	0.1				
Alley No. 43										
SVE2043100J09/30/1993L	Total Lead	10/11/1993	133	J	mg/kg	5	Moisture Content	10/11/1993	16.5	%
SVE2043100J09/30/1993L	TCLP Lead	11/23/1993	<0.1		mg/l.	0.1				
SVE2043200J09/30/1993L	Total Lead	10/11/1993	592		mg/kg	5	Moisture Content	10/11/1993	12.7	%
SVE2043200J09/30/1993L	TCLP Lead	11/23/1993	<0.1		mg/l.	0.1				
SVE204330DE09/30/1993L	Total Lead	10/11/1993	457		mg/kg	5	Moisture Content	10/11/1993	17	%
SVE204330DE09/30/1993L	TCLP Lead	11/23/1993	0.21		mg/l.	0.1				
SVE2043400J09/30/1993L	Total Lead	10/11/1993	395		mg/kg	5	Moisture Content	10/11/1993	7.6	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2043400J09/30/1993L	TCLP Lead	11/23/1993	0.45		mg/L	0.1				
Alley No. 47										
SVE2047100A09/21/1993L	Total Lead	09/30/1993	176		mg/kg	5	Moisture Content	09/30/1993	10.3	%
SVE2047200A09/21/1993L	Total Lead	09/30/1993	272		mg/kg	5	Moisture Content	09/30/1993	7.3	%
SVE2047300A09/21/1993L	Total Lead	09/30/1993	405		mg/kg	5	Moisture Content	09/30/1993	8.1	%
SVE2047400A09/21/1993L	Total Lead	09/30/1993	358		mg/kg	5	Moisture Content	09/30/1993	7.3	%
Alley No. 48										
SVE2048100J09/23/1993L	Total Lead	09/30/1993	33.2		mg/kg	5	Moisture Content	09/30/1993	9.1	%
SVE2048100J09/23/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE2048200J09/23/1993L	Total Lead	09/30/1993	492		mg/kg	5	Moisture Content	09/30/1993	19.5	%
SVE2048200J09/23/1993L	TCLP Lead	09/30/1993	0.77		mg/L	0.1				
SVE2048300J09/23/1993L	Total Lead	09/30/1993	276		mg/kg	5	Moisture Content	09/30/1993	17.1	%
SVE2048300J09/23/1993L	TCLP Lead	09/30/1993	0.12		mg/L	0.1				
SVE2048300J09/23/1993L.D	Total Lead	09/30/1993	120		mg/kg	5	Moisture Content	09/30/1993	16.8	%
SVE2048300J09/23/1993L.D	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE2048400J09/23/1993L	Total Lead	09/30/1993	19.1		mg/kg	5	Moisture Content	09/30/1993	10.8	%
SVE2048400J09/23/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
Alley No. 50										
SVE2050100J09/24/1993L	Total Lead	10/01/1993	127		mg/kg	5	Moisture Content	10/01/1993	13.7	%
SVE2050100J09/24/1993L	TCLP Lead	10/04/1993	<0.1		mg/L	0.1				
SVE205020A09/24/1993L	Total Lead	10/01/1993	231		mg/kg	5	Moisture Content	10/01/1993	11.3	%
SVE205020A09/24/1993L	TCLP Lead	10/04/1993	<0.1		mg/L	0.1				
SVE205030A09/24/1993L	Total Lead	10/01/1993	162		mg/kg	5	Moisture Content	10/01/1993	15.4	%
SVE205030A09/24/1993L	TCLP Lead	10/04/1993	<0.1		mg/L	0.1				

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2050400J09/24/1993L	Total Lead	10/01/1993	557		mg/kg	5	Moisture Content	10/01/1993	13.8	%
SVE2050400J09/24/1993L	TCLP Lead	10/04/1993	0.76		mg/l.	0.1				
Alley No. 51										
SVE2051100J09/22/1993L	Total Lead	09/30/1993	1,010		mg/kg	5	Moisture Content	09/30/1993	11.5	%
SVE2051100J09/22/1993L	TCLP Lead	09/30/1993	0.26		mg/l.	0.1				
SVE2051200J09/22/1993L	Total Lead	09/30/1993	236		mg/kg	5	Moisture Content	09/30/1993	14.8	%
SVE2051200J09/22/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
SVE2051300J09/23/1993L	Total Lead	09/30/1993	394		mg/kg	5	Moisture Content	09/30/1993	18	%
SVE2051300J09/23/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
SVE2051400J09/23/1993L	Total Lead	09/30/1993	465		mg/kg	5	Moisture Content	09/30/1993	14.3	%
SVE2051400J09/23/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
Alley No. 52										
SVE2052100A09/21/1993L	Total Lead	09/30/1993	277		mg/kg	5	Moisture Content	09/30/1993	7.3	%
SVE2052200A09/21/1993L	Total Lead	09/30/1993	624		mg/kg	5	Moisture Content	09/30/1993	9.8	%
SVE2052200A09/21/1993L	TCLP Lead	11/05/1993	<0.1		mg/l.	0.1				
SVE2052300A09/21/1993L	Total Lead	09/30/1993	229		mg/kg	5	Moisture Content	09/30/1993	6.1	%
SVE2052400A09/21/1993L	Total Lead	09/30/1993	425		mg/kg	5	Moisture Content	09/30/1993	10.5	%
Alley No. 54										
SVE2054100A09/23/1993L	Total Lead	09/30/1993	7,260		mg/kg	5	Moisture Content	09/30/1993	8.3	%
SVE2054100A09/23/1993L	TCLP Lead	09/30/1993	1.43		mg/l.	0.1				
SVE2054200A09/23/1993L	Total Lead	09/30/1993	1,400		mg/kg	5	Moisture Content	09/30/1993	23.3	%
SVE2054200A09/23/1993L	TCLP Lead	09/30/1993	0.22		mg/l.	0.1				
SVE2054300A09/23/1993L	Total Lead	09/30/1993	142		mg/kg	5	Moisture Content	09/30/1993	11.8	%

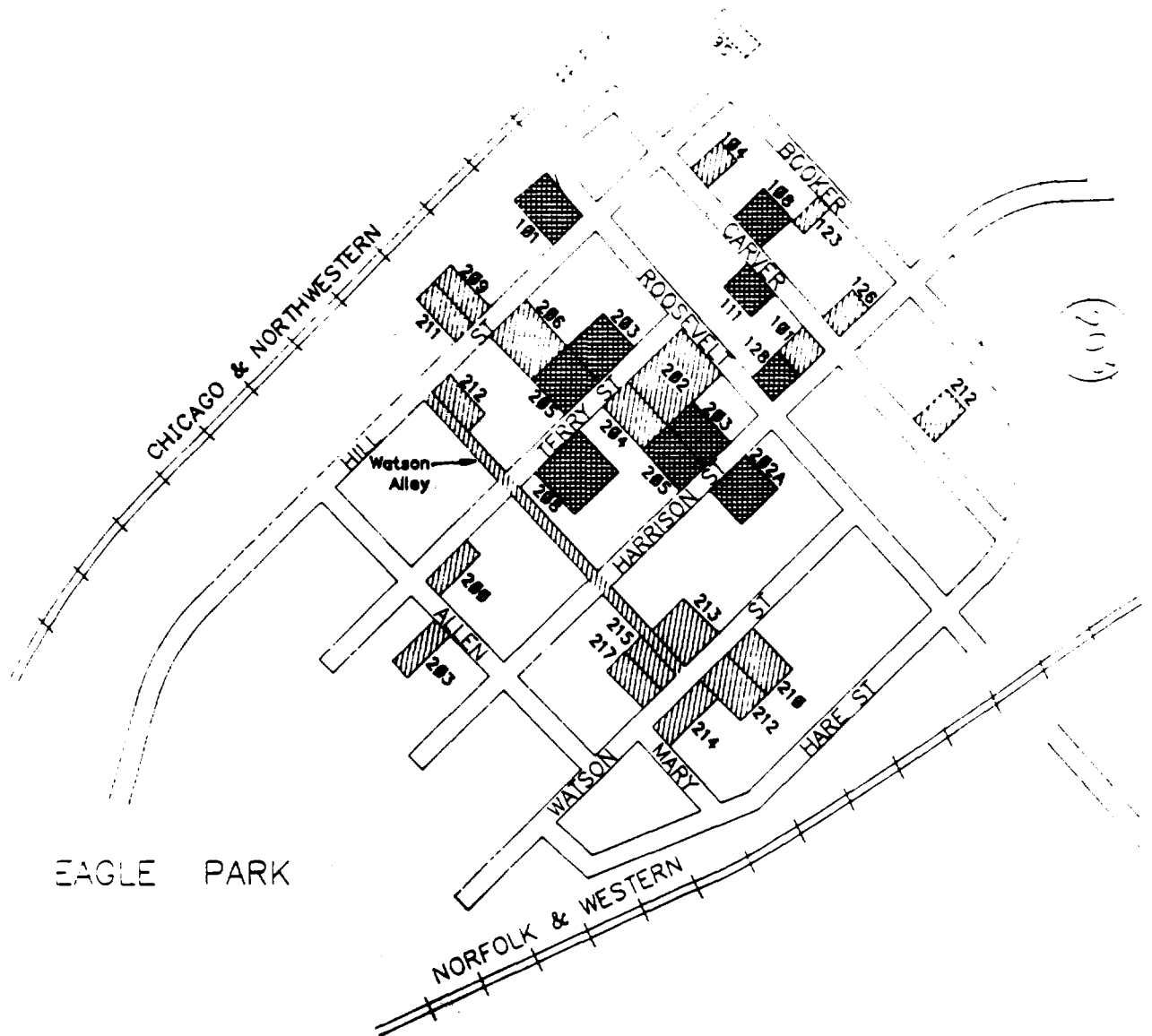
TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2054300A09/23/1993L	TCLP Lead	09/30/1993	0.1		mg/l.	0.1				
SVE2054400A09/23/1993L	Total Lead	09/30/1993	405		mg/kg	5	Moisture Content	09/30/1993	9.9	%
SVE2054400A09/23/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
Alley No. 55										
SVE2055100J09/20/1993L	Total Lead	09/30/1993	565		mg/kg	5	Moisture Content	09/30/1993	15.8	%
SVE2055100J09/20/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE2055200J09/21/1993L	Total Lead	09/30/1993	5,770		mg/kg	5	Moisture Content	09/30/1993	15.5	%
SVE2055200J09/21/1993L	TCLP Lead	09/30/1993	5.59		mg/l.	0.1				
SVE2055300J09/21/1993L	Total Lead	09/30/1993	762		mg/kg	5	Moisture Content	09/30/1993	12.5	%
SVE2055300J09/21/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE2055400J09/20/1993L	Total Lead	09/30/1993	2,770		mg/kg	5	Moisture Content	09/30/1993	12.8	%
SVE2055400J09/20/1993L	TCLP Lead	09/30/1993	2.45		mg/l.	0.1				
Alley No. 57										
SVE2057100A09/21/1993L	Total Lead	09/30/1993	3,780		mg/kg	5	Moisture Content	09/30/1993	11.6	%
SVE2057100A09/21/1993L	TCLP Lead	11/05/1993	0.89		mg/l.	0.1				
SVE2057200A09/21/1993L	Total Lead	09/30/1993	16,200		mg/kg	5	Moisture Content	09/30/1993	14.7	%
SVE2057200A09/21/1993L	TCLP Lead	11/05/1993	72.3		mg/l.	0.1				
SVE2057300A09/21/1993L	Total Lead	09/30/1993	2,260		mg/kg	5	Moisture Content	09/30/1993	17.4	%
SVE2057300A09/21/1993L	TCLP Lead	11/05/1993	<0.1		mg/L	0.1				
SVE2057400A09/21/1993L	Total Lead	09/30/1993	411		mg/kg	5	Moisture Content	09/30/1993	9.4	%
Alley No. 61										
SVE2061100J09/21/1993L	Total Lead	09/30/1993	796		mg/kg	5	Moisture Content	09/30/1993	11	%
SVE2061100J09/21/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
SVE2061200J09/21/1993L	Total Lead	09/30/1993	1,370		mg/kg	5	Moisture Content	09/30/1993	20.2	%

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SVE2061200J09/21/1993L	TCLP Lead	09/30/1993	1.47		mg/l.	0.1				
SVE2061300J09/21/1993L	Total Lead	09/30/1993	512		mg/kg	5	Moisture Content	09/30/1993	15.3	%
SVE2061300J09/21/1993L	TCLP Lead	09/30/1993	0.21		mg/l.	0.1				
SVE2061400J09/21/1993L	Total Lead	09/30/1993	31		mg/kg	5	Moisture Content	09/30/1993	9	%
SVE2061400J09/21/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
Alley No. 69										
SVE2069100J09/21/1993L	Total Lead	09/30/1993	494		mg/kg	5	Moisture Content	09/30/1993	16.5	%
SVE2069100J09/21/1993L	TCLP Lead	09/30/1993	0.33		mg/l.	0.1				
SVE2069200J09/21/1993L	Total Lead	09/30/1993	3,070		mg/kg	5	Moisture Content	09/30/1993	16.6	%
SVE2069200J09/21/1993L	TCLP Lead	09/30/1993	17.61		mg/l.	0.1				
SVE2069300J09/21/1993L	Total Lead	09/30/1993	355		mg/kg	5	Moisture Content	09/30/1993	8.2	%
SVE2069300J09/21/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
SVE2069400J09/21/1993L	Total Lead	09/30/1993	415		mg/kg	5	Moisture Content	09/30/1993	17.9	%
SVE2069400J09/21/1993L	TCLP Lead	09/30/1993	<0.1		mg/l.	0.1				
Alley No. 70										
SVE2070100A09/21/1993L	Total Lead	09/30/1993	289		mg/kg	5	Moisture Content	09/30/1993	3.9	%
SVE2070200A09/21/1993L	Total Lead	09/30/1993	580		mg/kg	5	Moisture Content	09/30/1993	5.1	%
SVE2070200A09/21/1993L	TCLP Lead	11/05/1993	<0.1		mg/l.	0.1				
SVE2070300A09/21/1993L	Total Lead	09/30/1993	808		mg/kg	5	Moisture Content	09/30/1993	16.9	%
SVE2070300A09/21/1993L	TCLP Lead	11/05/1993	0.17		mg/l.	0.1				
SVE2070400A09/21/1993L	Total Lead	09/30/1993	4,840		mg/kg	5	Moisture Content	09/30/1993	6.9	%
SVE2070400A09/21/1993L	TCLP Lead	11/05/1993	6.11		mg/l.	0.1				

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LEGEND



PROPERTY SAMPLED DURING SUPPLEMENTAL INVESTIGATION



PROPERTY SAMPLED DURING PDFI

NL/TARACORP SUPERFUND SITE
SUPPLEMENTAL INVESTIGATION

PROJECT NO.

C3M11Q

Woodward-Clyde
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DRN. BY: kdw 12/28/93

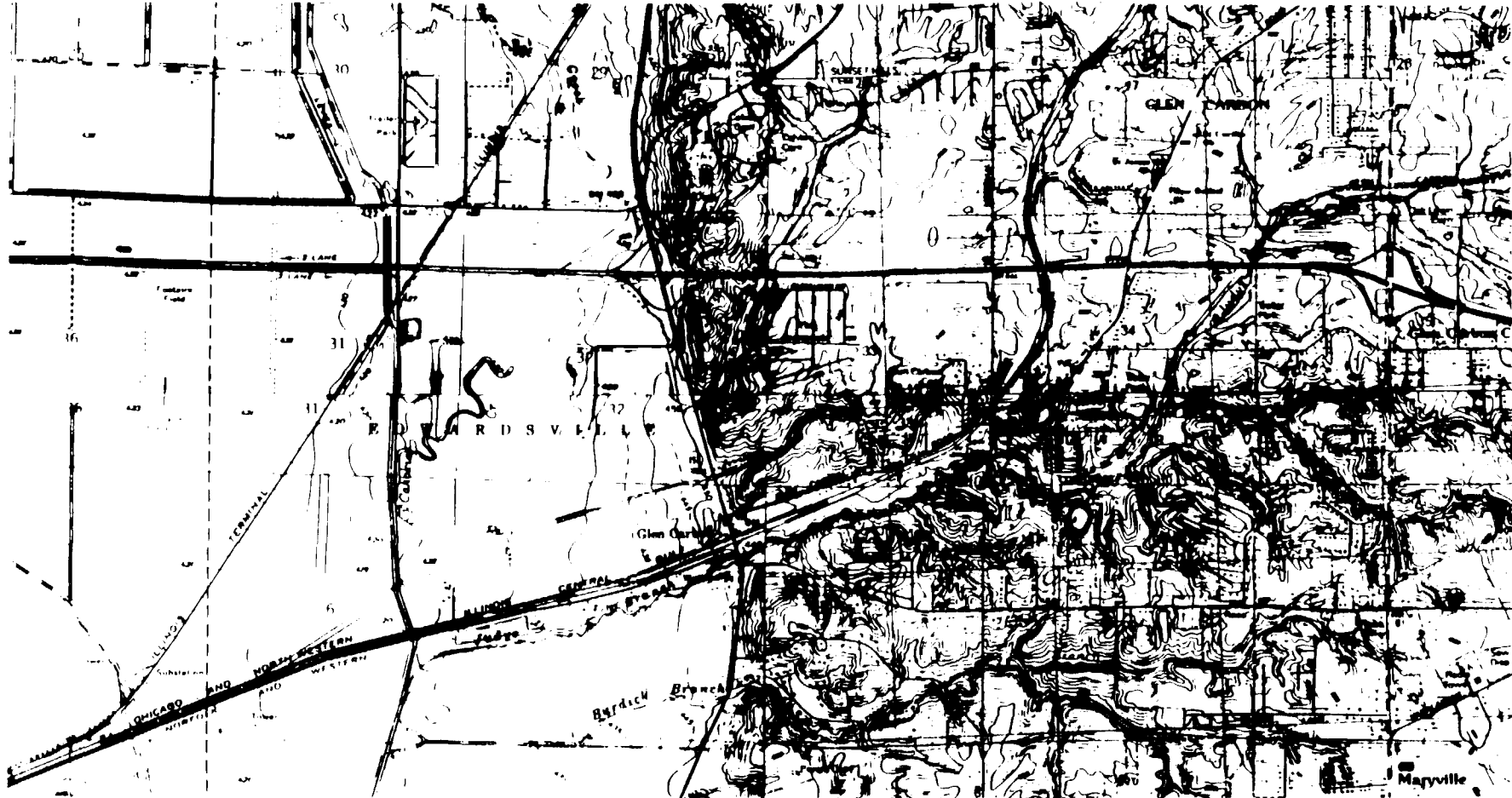
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CHKD. BY: CFP 1/5/93

Eagle Park Acres
Sampling Locations

FIG. NO.

5



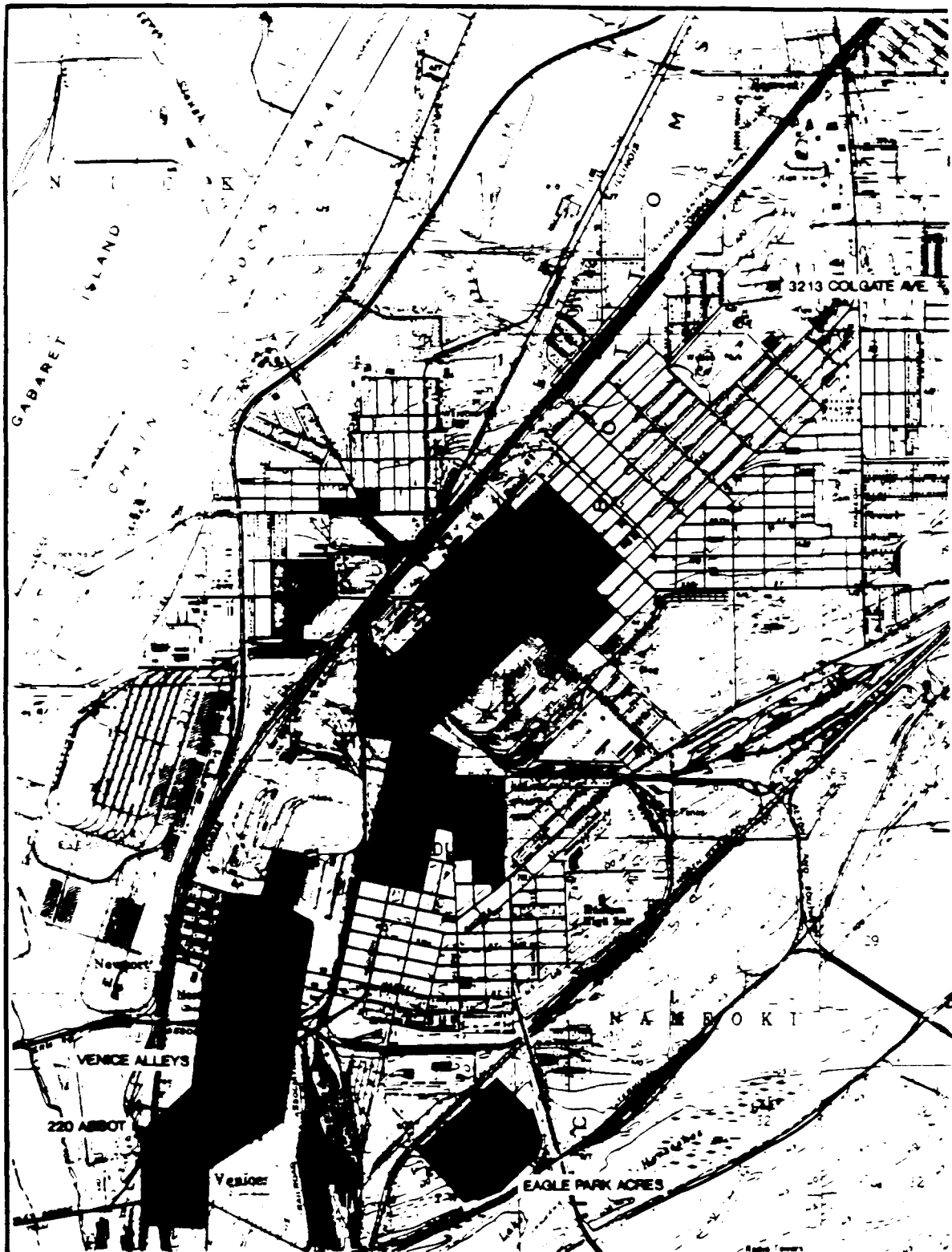
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■ REMOTE FILL AREA

NOTE Drawing taken from U.S.G.S. - Collinsville, IL dated 1991, Mank's Mound, IL dated 1954, Wood River, IL - MO dated 1955 and Edwardsville, IL dated 1991

2000 0 2000
SCALE FEET

NL/TARACORP SUPERFUND SITE SUPPLEMENTAL INVESTIGATION		PROJECT NO. C3M11Q
Woodward-Clyde Consultants		
Engineering & services applied to the earth & its environment		
DRN BY: km DESG BY: AP CHD BY:	8/4/93 Site Plan North	FIG NO. 3



LEGEND

- REMOTE FILL AREAS
- INDUSTRIAL AREAS
- RESIDENTIAL AREAS

NOTE: Drawing taken from U.S.G.S. - Granite City, IL-MO and Marks Mound, IL Quadrangles dated 1982 & 1974.

0 2000 4000
SCALE FEET

NL/TARACORP SUPERFUND SITE
SUPPLEMENTAL INVESTIGATION

PROJECT
CJM11

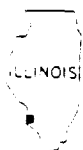
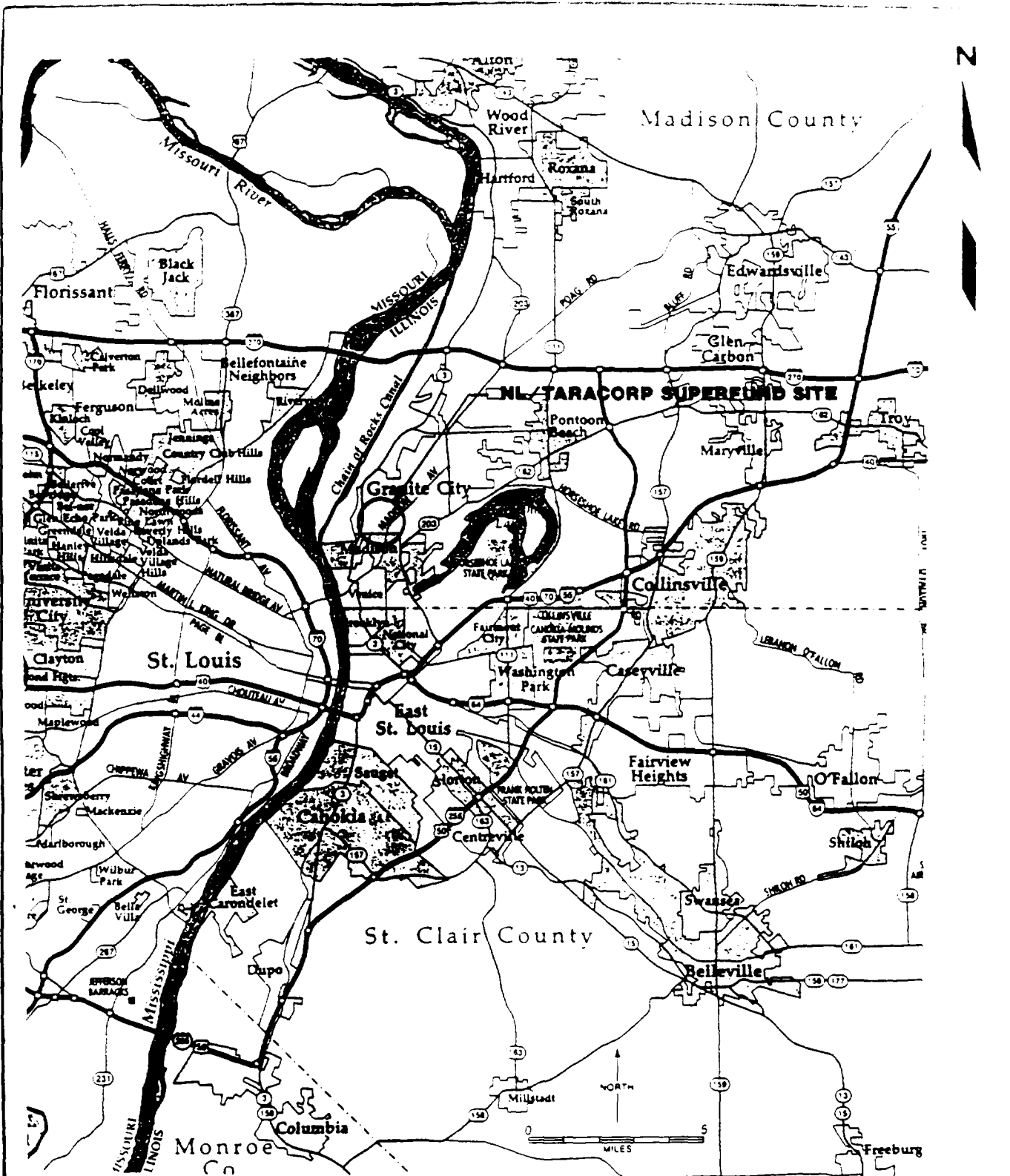
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DRN. BY: 7/23/83
DESIGN BY: 7/23/83
CHECK BY: 7/23/83

Site Plan South

nc



Site Location

NL/TARACORP SUPERFUND SITE
U.S. ARMY CORPS OF ENGINEERS
GRANITE CITY, ILLINOIS

PROJECT NO.
C3M11Q

Woodward-Clyde Consultants

CONSULTING ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS

DRN. BY kmm 7/18/91
CHKD BY *[signature]*

Site Location Map

FIG NO
1

FIGURES

TABLE 5

**SAMPLE IDENTIFICATION NOMENCLATURE
NL/TARACORP SUPERFUND SITE**

Each sample has a unique sample identification. The identification consists of sample matrix code, street code, lot number, boring number, sample depth code, and sample type. All of the codes are listed in the following tables with their appropriate description. An example follows to demonstrate the operation of the sample identification.

SMP1629200B00L

S	Sample Matrix (In this case, the sample matrix is soil, see SAMPLE MATRICES table.)
MP	Street Code (In this case, the sample location is on Maple Street, see STREET CODE table.)
1629	Lot Number (In this case, the sample was taken at lot/house number 1629.)
2	Boring Number (In this case, the sample was taken from the 2nd boring on the property.)
00B	Sample Depth (In this case, the sample was taken between 3 - 6 inches from the boring indicated, see SAMPLE DEPTHS table.)
00L	Sample Type (In this case, the sample was analyzed for Total Lead, see SAMPLE TYPES table.)

SAMPLE MATRICES

S	Soil Sampled for Chemical Analysis &/or Geotechnical
W	Groundwater Sampled from Monitoring Wells

TABLE 5

**SAMPLE IDENTIFICATION NOMENCLATURE
NL/TARACORP SUPERFUND SITE**

STREET CODES

RESIDENTIAL

AD	ADAMS	OH	OHIO
AL	ALTON	OL	OLIVE
BE	BENTON	RE	REYNOLDS
BR	BRYAN	RR	ROCK ROAD
CH	CHESTNUT	SA	SALVETER
CL	CLEVELAND	SP	SPRUCE
DE	DELMAR	ST	STATE
DV	DENVER	WA	WALNUT
ED	EDISON	WS	WASHINGTON
EL	ELIZABETH		
ER	EDWARDSVILLE ROAD	ET	18th
GR	GRAND	FI	5th
GW	GREENWOOD	NT	19th
IO	IOWA	TL	12th
KE	KENNEDY	SN	2nd
LE	LEE	SV	7th
LO	LOGAN	TW	20th
MA	MADISON	TS	22nd
MP	MAPLE	WT	W. 20th
MC	McCAMBRIDGE		
ME	MEREDOCIA		
MO	MISSOURI		
NI	NIEDRINGHAUS		

INDUSTRIAL AND REMOTE FILL AREAS

BV	BV & G TRANSPORT	BK	BOOKER
OR	OTHER REMOTE FILL AREAS	CA	CARVER
RO	RICH OIL	CO	COLGATE
TA	TARACORP	HA	HARRISON
TR	TRUST 454	HI	HILL
VE	VENICE ALLEYS	RS	ROOSEVELT
AN	ALLEN	TE	TERRY
		WN	WATSON

TABLE 5

**SAMPLE IDENTIFICATION NOMENCLATURE
NL/TARACORP SUPERFUND SITE**

SAMPLE DEPTH

<u>CODE</u>	<u>DEPTH</u>
00A	0-3 inches
00B	3-6 inches
00C	6-12 inches
00D	1-2 feet
00E	2-3 feet
00F	3-4 feet
00G	4-5 feet
00H	5-6 feet
00I	6-7 feet
00J	0-2 feet
00K	2-4 feet
00L	4-6 feet
00M	6-8 feet
00N	8-10 feet
00P	10-12 feet
00R	12-14 feet
00S	14-15 feet
00T	13-15 feet
00U	10-11 feet
00V	15-16 feet
00W	20-21 feet
00X	25-26 feet
0AB	0-6 inches
0AC	0-1 feet
0DE	1-3 feet
0GG	Top of Groundwater

TABLE 5

**SAMPLE IDENTIFICATION NOMENCLATURE
NL/TARACORP SUPERFUND SITE**

SAMPLE TYPE

00G	Geotechnical Sample
0GD	Geotechnical Duplicate
0GQ	Geotechnical QA Sample
00L	Total Lead Sample
0LD	Total Lead Duplicate Sample - Boring 1
0LQ	Total Lead Quality Assurance
0XM	Total Lead, Boring 2, Duplicate - # 1
0XX	Total Lead, Boring 2, Duplicate - # 2
00T	TCLP Lead Sample
0TD	TCLP Lead Duplicate
0TQ	TCLP Lead Quality Assurance
0TM	TCLP Lead Matrix Spike
0TX	TCLP Lead Matrix Spike Duplicate
00W	Groundwater Sample
0WD	Groundwater Duplicate
0WB	Groundwater Rinsate Blank
0WM	Groundwater Matrix Spike
0WX	Groundwater Matrix Spike Duplicate
0WQ	Groundwater QA Sample
0WR	Groundwater QA Matrix Spike
0WS	Groundwater QA Matrix Spike Duplicate
0WT	Groundwater QA Rinsate Blank
0TB	Trip Blank
0RS	Re-Sample

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
Alley No. 59.5										
SVE259510AB09/22/1993L	Total Lead	09/30/1993	166		mg/kg	5	Moisture Content	09/30/1993	18.2	%
SVE259510AB09/22/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE259520AB09/22/1993L	Total Lead	09/30/1993	199		mg/kg	5	Moisture Content	09/30/1993	16.2	%
SVE259520AB09/22/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE259530AB09/22/1993L	Total Lead	09/30/1993	196		mg/kg	5	Moisture Content	09/30/1993	17.8	%
SVE259530AB09/22/1993L	TCLP Lead	09/30/1993	<0.1		mg/L	0.1				
SVE259540AB09/22/1993L	Total Lead	09/30/1993	365		mg/kg	5	Moisture Content	09/30/1993	9.1	%
SVE259540AB09/22/1993L	TCLP Lead	09/30/1993	0.15		mg/L	0.1				

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
OTHER REMOTE FILL										
205 Abbott SAB0205100A10/06/1993L	Total Lead	10/20/1993	169		mg/kg	5	Moisture Content	10/20/1993	8.7	%
SAB0205300A10/06/1993L	Total Lead	10/20/1993	294		mg/kg	5	Moisture Content	10/20/1993	14.2	%
3213 Colgate SCO3213100A10/06/1993L	Total Lead	10/20/1993	82.2		mg/kg	5	Moisture Content	10/20/1993	5.2	%
SCO3213200A10/06/1993L	Total Lead	10/20/1993	71.4		mg/kg	5	Moisture Content	10/20/1993	14.6	%
Glen Carbon Alley SOR2002100J10/01/1993L	Total Lead	10/11/1993	472		mg/kg	5	Moisture Content	10/11/1993	11	%
SOR2002100K10/01/1993L	Total Lead	10/11/1993	64.5		mg/kg	5	Moisture Content	10/11/1993	16	%
SOR2002200J10/01/1993L	Total Lead	10/11/1993	4,660		mg/kg	5	Moisture Content	10/11/1993	13.2	%
SOR2002200J10/01/1993L	TCLP Lead	12/07/1993	23.2		mg/l.	0.1				
SOR2002200K10/01/1993L	Total Lead	10/11/1993	106		mg/kg	5	Moisture Content	10/11/1993	19	%
SOR2002300D10/01/1993L	Total Lead	10/11/1993	52.9		mg/kg	5	Moisture Content	10/11/1993	16.5	%
SOR200230AC10/01/1993L	Total Lead	10/11/1993	2,413		mg/kg	5	Moisture Content	10/11/1993	10.4	%
SOR200230AC10/01/1993L	TCLP Lead	12/07/1993	4.35		mg/l.	0.1				
SOR2002400J10/01/1993L	Total Lead	10/11/1993	1,050		mg/kg	5	Moisture Content	10/11/1993	6.7	%
SOR2002400J10/01/1993L	TCLP Lead	12/07/1993	2.26		mg/l.	0.1				
SOR2002400K10/01/1993L	Total Lead	10/11/1993	221		mg/kg	5	Moisture Content	10/11/1993	18.8	%
SOR2002500D10/01/1993L	Total Lead	10/11/1993	47.3		mg/kg	5	Moisture Content	10/11/1993	15.7	%
SOR200250AC10/01/1993L	Total Lead	10/11/1993	1,036		mg/kg	5	Moisture Content	10/11/1993	9.1	%
SOR200250AC10/01/1993L	TCLP Lead	12/07/1993	0.9		mg/l.	0.1				
SOR2002600D10/01/1993L	Total Lead	10/11/1993	14		mg/kg	5	Moisture Content	10/11/1993	17.3	%
SOR200260AC10/01/1993L	Total Lead	10/11/1993	6,798		mg/kg	5	Moisture Content	10/11/1993	11.4	%
SOR200260AC10/01/1993L	TCLP Lead	12/07/1993	<0.1		mg/l.	0.1				

TABLE 4
ANALYTICAL RESULTS FOR REMOTE FILL AREAS
NL/TARACORP SUPERFUND SITE – SUPPLEMENTAL INVESTIGATION

SAMPLE ID	PARAMETER	ANALYSIS DATE	RESULT	QUALIFIER	UNITS	REPORTING DETECTION LIMIT	PARAMETER	ANALYSIS DATE	RESULT	UNITS
SOR2002700D10/01/1993L	Total Lead	10/11/1993	97.3		mg/kg	5	Moisture Content	10/11/1993	18.5	%
SOR200270AC10/01/1993L	Total Lead	10/11/1993	6,017		mg/kg	5	Moisture Content	10/11/1993	7.2	%
SOR200270AC10/01/1993L	TCLP Lead	12/07/1993	3.75		mg/L	0.1				
SOR2002800J10/01/1993L	Total Lead	10/11/1993	175		mg/kg	5	Moisture Content	10/11/1993	12.2	%
SOR2002800J10/01/1993L.D	Total Lead	10/11/1993	103		mg/kg	5	Moisture Content	10/11/1993	13.8	%
SOR2002800K10/01/1993L	Total Lead	10/11/1993	10.3		mg/kg	5	Moisture Content	10/11/1993	19.8	%
276 Collinsville Road Glen Carbon										
SOR2003100A10/06/1993L	Total Lead	10/20/1993	42.2		mg/kg	5	Moisture Content	10/20/1993	15	%
SOR2003200A10/06/1993L	Total Lead	10/20/1993	58.4		mg/kg	5	Moisture Content	10/20/1993	8.4	%
SOR2003300A10/06/1993L	Total Lead	10/20/1993	469		mg/kg	5	Moisture Content	10/20/1993	7.3	%
SOR2003400A10/06/1993L	Total Lead	10/20/1993	288		mg/kg	5	Moisture Content	10/20/1993	13.6	%
RINSTATE BLANKS										
RCA0104100010/13/1993WB	Total Lead	10/21/1993	<0.1		mg/L	0.1				
RVE2043300009/30/1993WB	Total Lead	10/19/1993	<0.1		mg/L	0.1				

DATA QUALIFIER CODES

- U The compound was analyzed for but was not detected. The associated numerical value is attributed to contamination and is considered to be the sample quantitation limit.
- J The associated numerical value is an estimated quantity.
- UJ The compound was analyzed for but was not detected. The sample quantitation limit is an estimated quantity.
- R The data are unusable (whether the compound is present or not). Resampling and reanalysis are necessary for verification.

PRELIMINARY ASSESSMENT OF DATA FROM THE MADISON COUNTY LEAD STUDY AND IMPLICATIONS FOR REMEDIATION OF LEAD-CONTAMINATED SOIL

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1. INTRODUCTION

The data on blood lead, environmental lead, and family interviews for 490 children in Madison County, Illinois, were provided to us by the Institute for Evaluating Health Risks (IEHR) through the U.S. Department of Justice. The study was carried out in 1991 by U.S. EPA, Illinois EPA, the Illinois Dept. of Public Health (IDPH) and the Agency for Toxic Substances and Disease Registry (ATSDR). We requested access to the data from IDPH, which was provided by their contractor, IEHR. Evaluating Health Risks (IEHR). The data were sent to us on diskette in ASCII format. We converted these data into a SYSTAT (Wilkinson 1992) data file, from which all subsequent analyses reported here were performed. Additional analyses will require creation of SAS data sets. Analyses of the data were reported by IDPH (February 1994) and in a more compact form by ATSDR (May 1994). U.S. EPA provided a critical review of these analyses (Marcus et al., May 1994).

The purposes for our reanalyses of the data are:

1. To assess the results described in (IDPH 1994) for use in evaluating childhood lead exposure in Madison County;
2. To provide site-specific information about relevant parameters in the EPA Integrated Exposure, Uptake, and Biokinetic Model for Lead (IEUBK Model);
3. To evaluate the proposed soil remediation level of 500 ppm using this recent information.

This is only a very preliminary report of results. A more detailed report will be prepared, describing the methods used in the analyses, a complete set of results, and the basis for our conclusions. This report is divided into the following sections. Section 2 reports the results of the preliminary analyses. Complete technical details will follow in a subsequent report. Section 3 presents the basis for a soil lead cleanup level. Section 3.1 describes the empirical basis for the findings, which combines personal observation of the site, results of data analyses, and professional judgements about the site. Section 3.2 describes the soil lead results when input values for the IEUBK Model from Section 3.1 are used, and describes the reevaluation of the soil lead cleanup level for the site.

2. SUMMARY AND CONCLUSIONS FROM DATA ANALYSES

A large number of graphs using these data are attached. The following results are based on these figures. Note that with few exceptions, the logarithms of the environmental lead concentrations and blood lead concentrations were used since the distribution of each variable is skewed to the right. All are "natural" base e logarithms, not common base 10 logarithms. The error bars on the graphs show the standard error of the (geometric) mean. The exact distance of the household from the NL site is not in the data set, only location within (approximate) 1/8 mile rings around the smelter. No information is provided about the quadrant or direction from the smelter site, and no information is provided about the city or township where each child lives.

We reanalyzed data on 490 pre-school age children in 351 households in Madison County, Illinois. These data contain no information on location within the study area, apart from approximate distance of the child's household from the NL/Taracorp site ("NL site"), and in particular do not identify the child's community of residence, so the results cannot be ascribed to any locale such as Granite City, Madison, or Venice. Our analyses of these data showed that:

1. Sixteen percent of the children had blood concentrations of 10 ug/dl or greater in the Madison County study area as a whole, but the percentage of lead-burdened children increased with decreasing distance from the NL smelter site. The increase was from 7 percent of children living at a distance greater than 0.75 miles from the NL site to about 26 percent of children in the study who lived in the area closest to the site. The areas closest to the site would be considered as appropriate for remediation, based on remedial investigations, by current EPA criteria. (Figure 1)

2. The percentage of children in the study with blood lead concentrations of 15 ug/dl or greater increased from about 2 percent of children living at a distance greater than 0.75 miles from the NL site to about 9 percent of children within 0.4 miles of the site. None of the children living at a distance of a mile or more from the NL site had a blood lead of 20 ug/dl or greater, whereas about 5 percent of the pre-school children who lived within half a mile from the NL site had a blood lead of at least 20 ug/dl. A blood lead concentration of 20 ug/dl is well above EPA's level of concern of 10 ug/dl and is associated with a substantially increased risk of permanent and irreversible neurobehavioral damage. Current CDC guidelines recommend individual environmental or medical intervention with children whose blood lead concentrations are at least 20 ug/dl. (Figures 2 and 3).

3. Blood lead concentration, soil lead concentration, and house dust lead concentration show very similar patterns of decreasing concentration with increasing distance from the NL site, on average. Loadings of deteriorating lead paint inside and outside the house show little or no relationship to distance from the NL site. This suggests that deteriorating lead-based paint is not the most important environmental

factor in childhood blood lead in Madison County, and is much less important than soil lead and dust lead. (Figures 4, 5, 6, 7, 8).

4. Tap water lead concentrations are highest, on average, in the area closest to the NL smelter, but show little relation to distance from the site farther away. This suggests that tap water lead may be a contributing factor, but is not the primary environmental factor in childhood blood lead in the Madison County study. (Figure 9).

5. Total dust loading shows almost no relationship to distance from the NL site, on average, so that increased dustiness of homes cannot explain the higher household dust lead loadings found near the NL site; it is the higher concentration of lead in household dust that accounts for higher dust lead loadings near the NL site. Further studies are needed to determine whether this is an artifact of the method of house dust sampling, or whether this is a generalizable conclusion. (Figures 10, 11).

6. Lead in household dust is the primary exposure pathway for young children. Lead in soil and lead in deteriorating lead-based paint are primary sources for lead in house dust, with substantial variability from one household to another.

7. Many socio-demographic factors are related to individual childhood blood lead concentrations, and also show a systematic relationship to distance from the NL site. These include increasing parental education, increasing income, and decreasing numbers of pre-school children per household with increasing distance from the smelter. Households in the study with the most children and the fewest resources to cope with lead poisoning are located closest to the NL site. (Figures 12, 13, 14, 15).

8. Individual child-specific behaviors may affect blood lead concentration, with substantial differences among children. These include hours of outdoor play, frequency of mouthing non-food objects, and hours of indoor play on the floor. There are some systematic relationships, such as a highly significant tendency for children in the study who live closer to the site to have more hours of outdoor play, on average, than children who live farther away (Figures 16, 17) and 17a.

9. In view of correlations that were found between distance from the NL site, blood lead, environmental lead, household socio-demographic characteristics, and typical child behavior, there are some concerns that the sample of children may not be representative of the community. This study used volunteer subjects. The lowest response rate was in the zone farthest from the NL site, 39 percent. Response rates were similar in the other three zones closer to the NL site, respectively 51 percent in the closest zone, 60 percent in the next closest, and 53 percent in the next closest. One must assume that there were no systematic biases in recruitment related to important factors that affect child blood lead, such as socio-economic status or behavior.

10. Percentage of explained variability in the logarithm of blood lead is not a

useful criterion in model assessment, since it depends on the range and the distribution of predictor variables within the data set. In comparison with all other studies of child blood lead data that EPA has performed, including urban and rural sites, active and inactive lead smelter or lead mining sites, the child blood lead data from the Madison County study has a higher percentage of explained variation (40 percent) than most other studies, and environmental lead explains a comparable percentage of variance (18 percent in our analyses) to other inactive smelter sites. Both the magnitude and strength of the relationships between blood lead and environmental lead are comparable to those we have seen at other sites. The linear regression relationships for blood lead vs. lead in soil, dust, and drinking water are statistically significant in all appropriate model specifications.

3. CALCULATION OF SOIL LEAD CLEANUP CONCENTRATIONS.

3.1. SUMMARY AND CONCLUSIONS: SITE-SPECIFIC PROPERTIES FOR RISK ASSESSMENT

1. The NL/Taracorp site appears to have properties that are characteristic of other recently inactive lead smelter sites. The areas closest to the site have soil and dust lead concentrations that are appropriate to airborne particulates from smelter emissions. These particles are generally easily transported from exterior soil into household dust, and are likely to be small, soluble, and highly bioavailable.

2. These analyses, plus observation of Granite City neighborhoods closest to the NL site, show that:

- (i) there are many young children in the community,
- (ii) children often play outdoors for much of the day,
- (iii) residential yards often contain large bare areas without grass cover,
- (iv) adjacent yards are often not fenced and are readily accessible to young children,
- (v) the residential areas are surrounded by industrial areas and by transportation routes that contribute to the total environmental impact on these children.

3.2. SOIL LEAD CLEANUP LEVELS USING THE IEUBK MODEL

1. Site-specific parameters were based on our judgement and analyses that the NL site had many points of similarity to the calibration site, Midvale, and that it is appropriate to assume no mitigating factors that may reduce childhood exposure to dust and soil.

2. The default parameters with an assumed soil-to-dust coefficient of 70 percent provided a very good fit to the blood lead data, in terms of geometric mean blood lead, percentiles of the blood lead distribution, and reasonable correlation between observed

and predicted blood lead. The over-all goodness of fit was comparable or better to that for the calibration community, the lead smelter community of Midvale, Utah. (Figures 18, 19, 20).

3. Sensitivity analyses were based on a range of values for the contribution of lead-contaminated soil to household dust. The default assumption, that the concentration of soil-derived lead in house dust is 0.70 of the soil lead concentration, was judged to be appropriate, and also provided a very good fit to the child blood lead data from the Madison County study. Alternative values in the sensitivity analyses were based on statistical analyses from study data: 0.29 (distances up to 1/4 mile), 0.46 (all data), and 0.55 (distances to 3/8 mile). The curvilinearity in the blood lead vs. environmental lead relationship was characterized by a passive-to-total gut lead absorption fraction of 0.20, as found from in-vitro studies. The higher dust/soil coefficients of 0.70 and 0.55 are more appropriate for risk assessment, more realistic for properties of the site, and provide a good fit to the data.

4. Remediation goals for soil abatement were calculated from the IEUBK Model so as to generate not more than 5 percent of children of ages 6 to 84 months with blood lead 10 ug/dl or greater. The calculated soil lead concentrations depended on the assumptions one made about soil to dust transport, but otherwise assumed only default parameters. The soil remediation levels ranged from 340 ppm (soil-to-dust coefficient = 0.70) to 480 ppm (soil-to-dust coefficient of 0.29). This suggests a range of soil lead cleanup values of 400 to 500 ppm. The results are shown in Table 1.

REFERENCES

1. Illinois Department of Public Health, 1994. Madison County Lead Exposure Study. Granite City, Illinois. Draft for public comment. Springfield, Illinois, Feb. 1994.
2. Marcus A.H., Hogan K., White P., Van Leeuwen P. 1994. Comments on Madison County Lead Exposure Study. Granite City, Illinois. In-house memo, U.S. Environmental Protection Agency, May 1994; corrected draft, Sept. 18, 1994. Research Triangle Park, NC.
3. Agency for Toxic Substances and Disease Registry, 1994. Comments on Multisite Lead and Cadmium Exposure study with Biological Markers Incorporated. Review draft. Atlanta, Georgia.
4. Wilkinson, L. 1992. SYSTAT: The System for Statistics. Systat Inc., Evanston IL.

TABLE 1
SENSITIVITY ANALYSES FOR SOIL LEAD CLEANUP LEVELS

SOIL CONTRIBUTION TO HOUSE DUST	SOIL LEAD CLEAN-UP CONCENTRATION (ppm)
0.70 (default)	340
0.55	370
0.46	420
0.29	480

PERCENT WITH BLOOD LEAD 10+ VS. DISTANCE FROM NL S

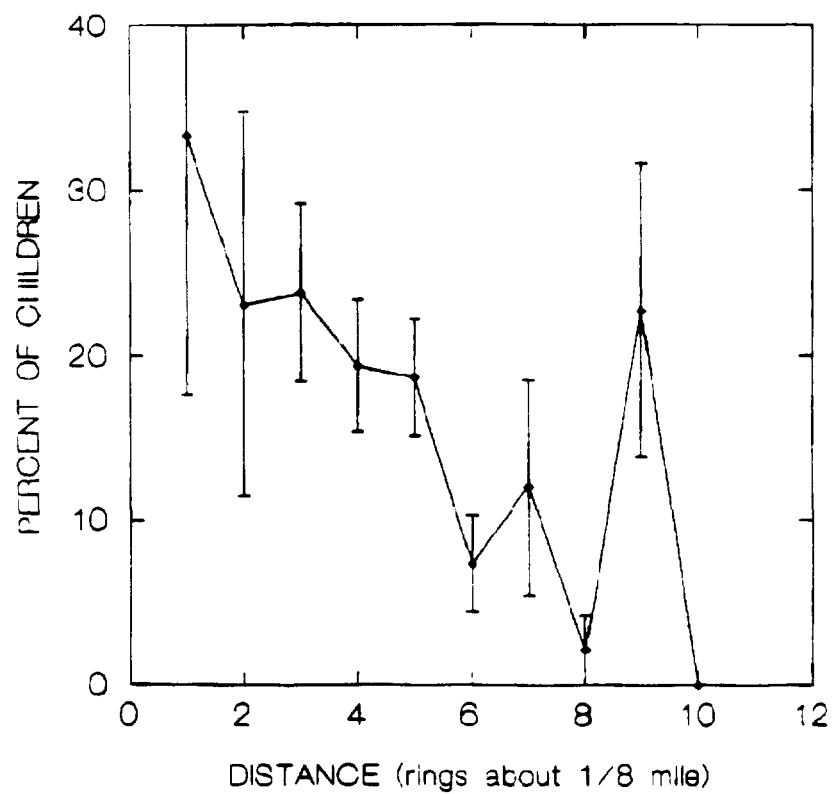


FIGURE 1

PERCENT WITH BLOOD LEAD 15+ VS. DISTANCE FROM NL S

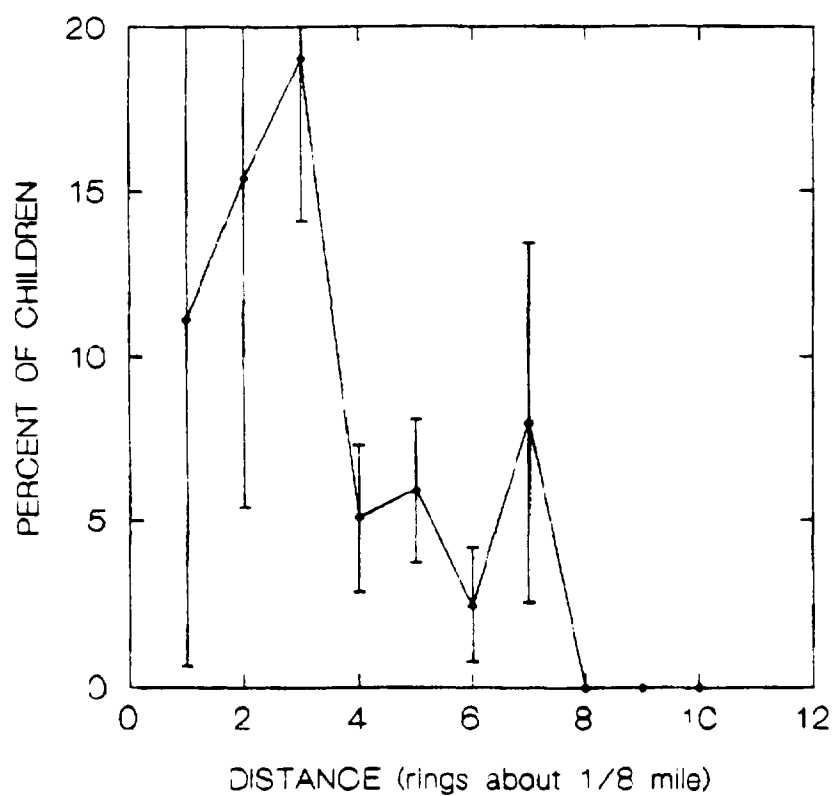


FIGURE 2

PERCENT WITH BLOOD LEAD 20+ VS. DISTANCE FROM NL S

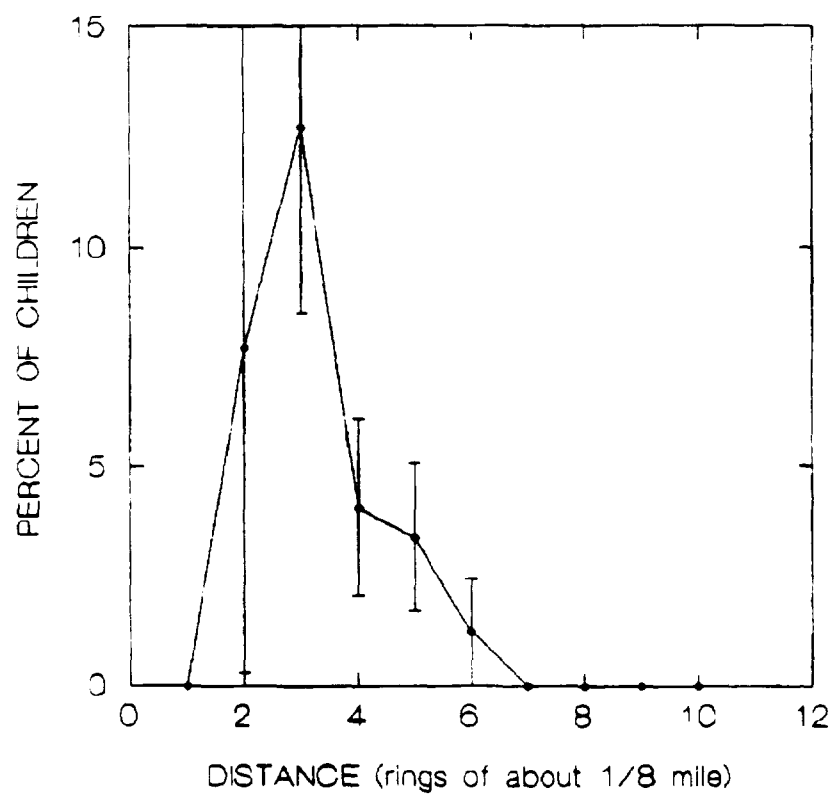


FIGURE 3

MEAN BLOOD LEAD VS. DISTANCE FROM NL SITE

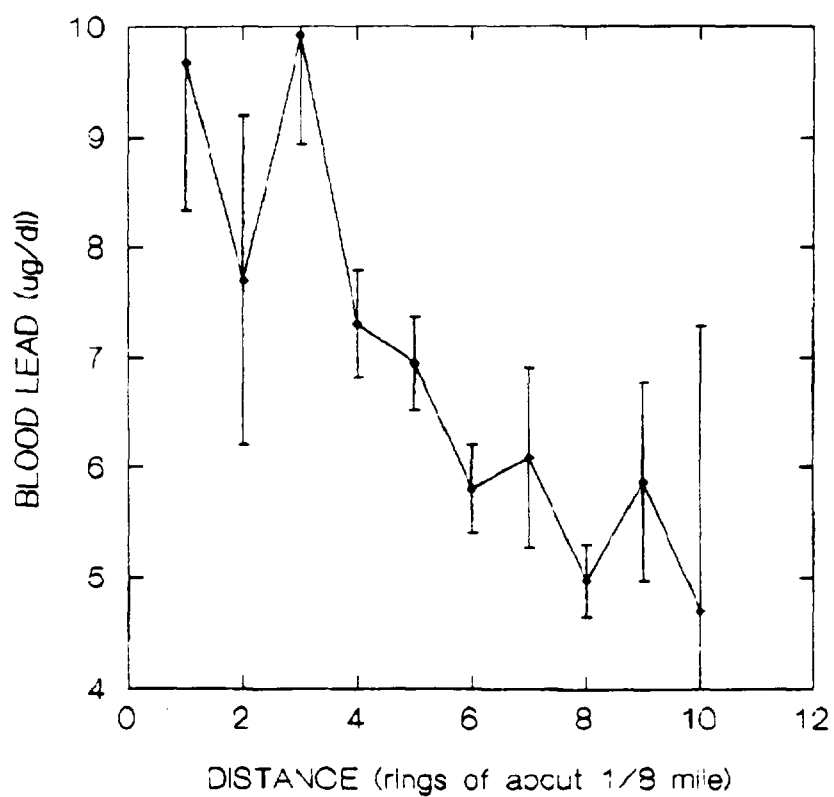


Figure 4

MEAN LOG BLOOD LEAD VS DISTANCE FROM NL SITE

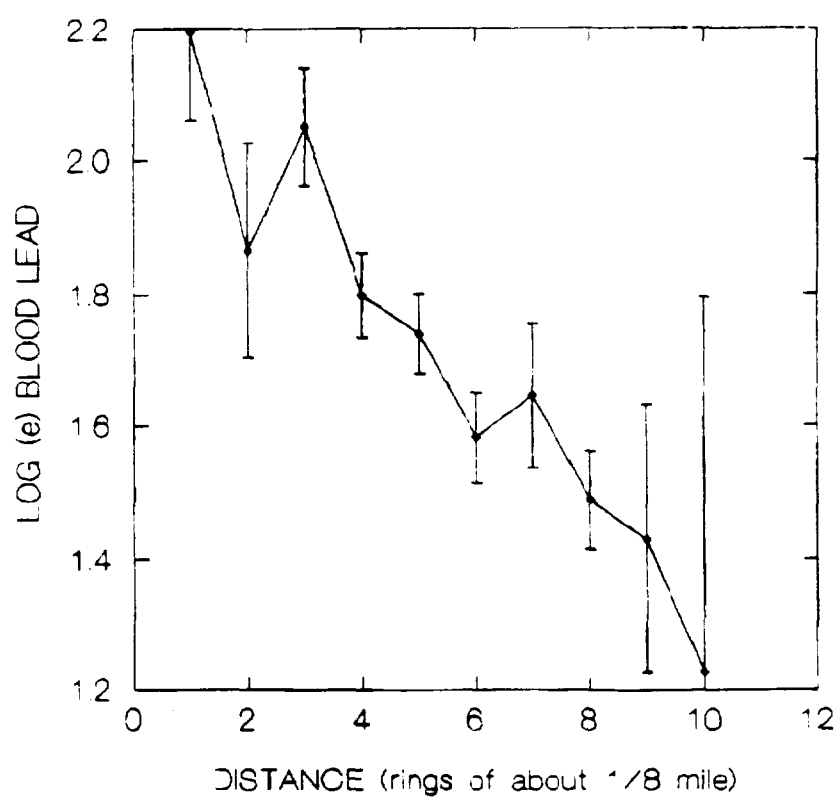


Figure 4a

LOG OF SOIL LEAD CONC. VS. DISTANCE FROM NL SITE

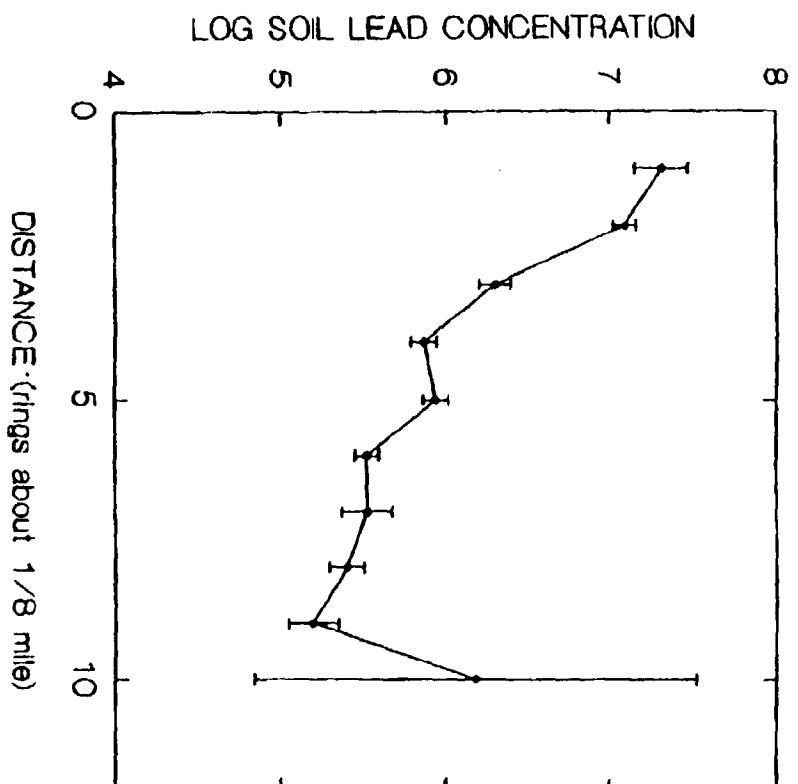


Figure 5

LOG OF DUST LEAD CONC. VS. DISTANCE FROM NL SITE

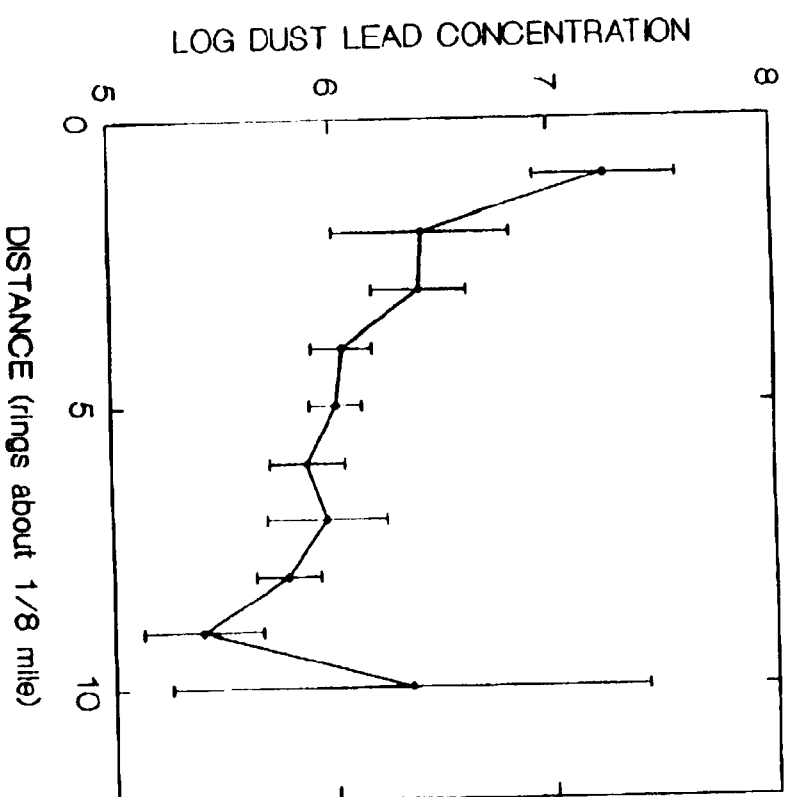


Figure 6

LOG INTERIOR LEAD PAINT VS. DISTANCE FROM NL SITE

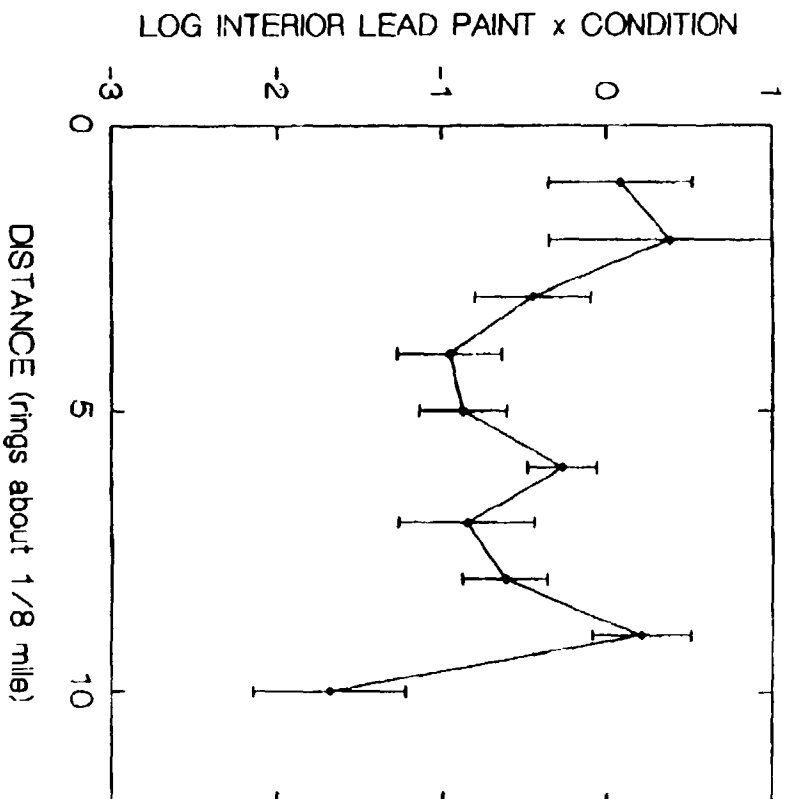


Figure 7

LOG EXTERIOR LEAD PAINT VS. DISTANCE FROM NL SITE

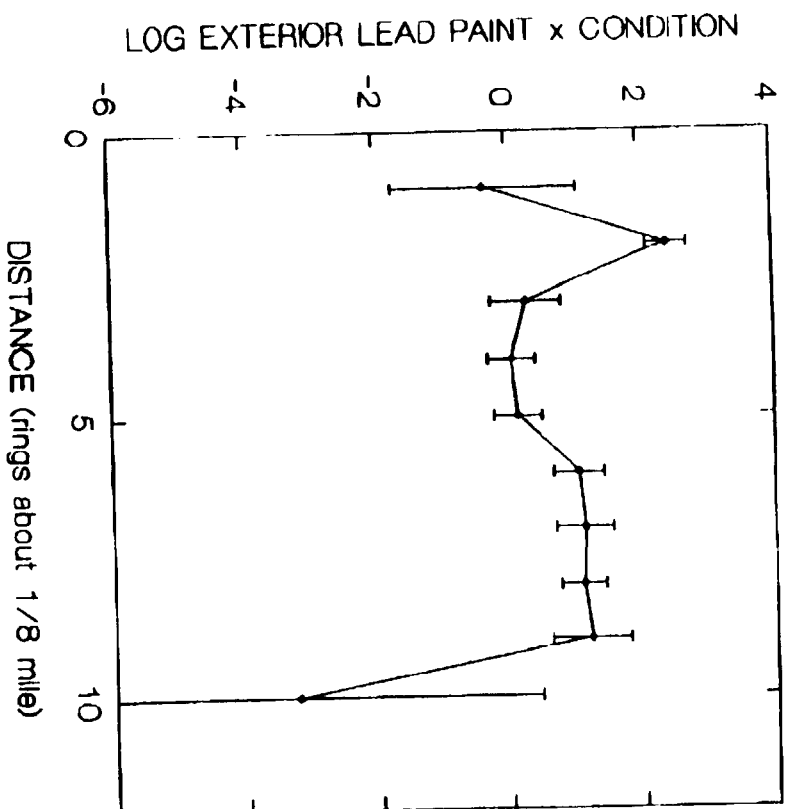


Figure 8

LOG OF WATER LEAD CONC VS. DISTANCE FROM NL SITE

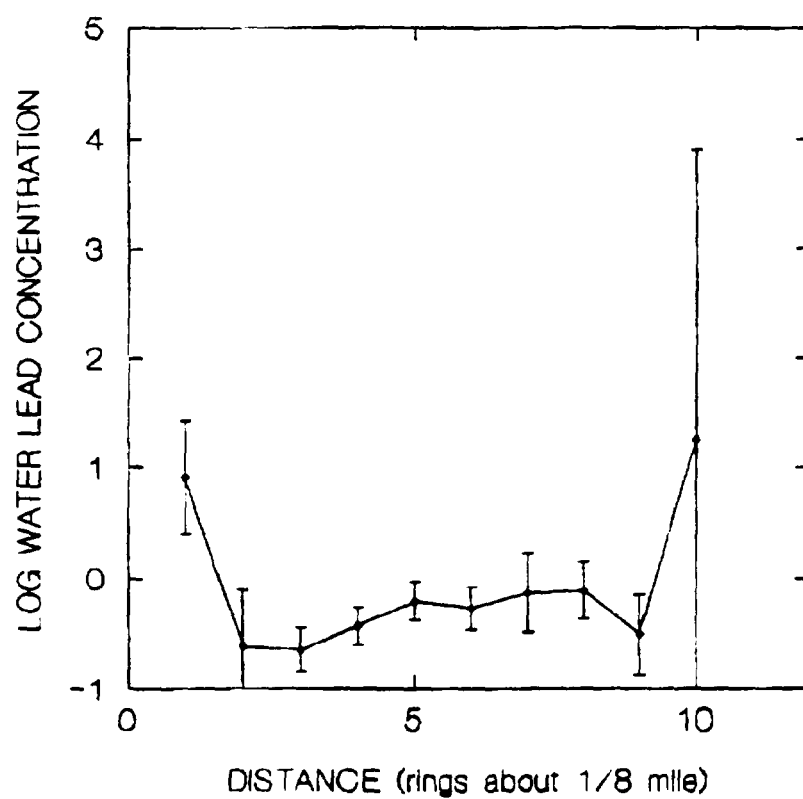


Figure 9

TOTAL DUST LOADING VS. DISTANCE FROM NL SITE

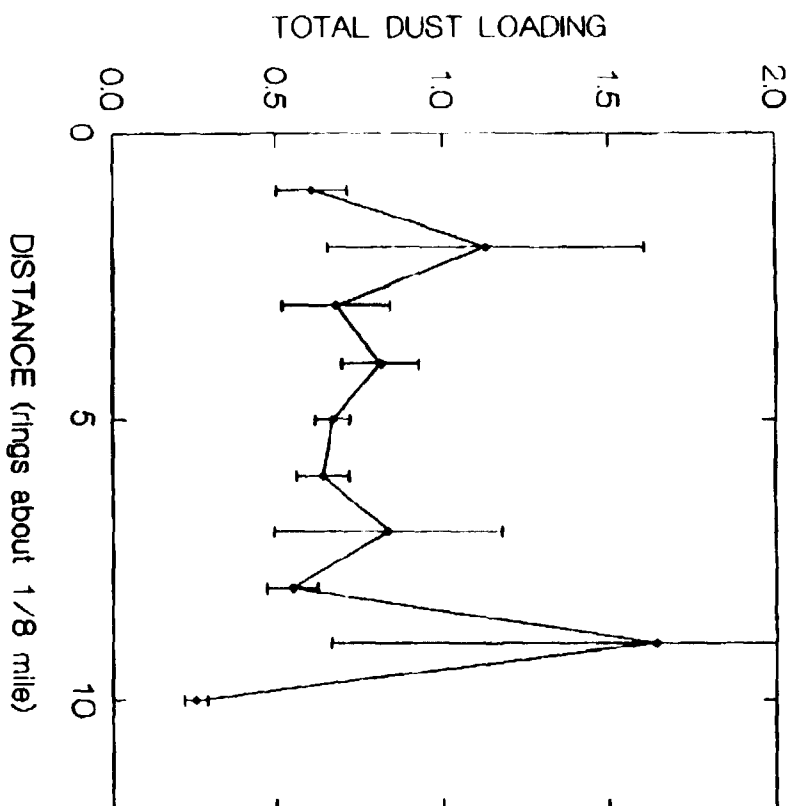


Figure 10

LOG OF DUST LEAD LOADING VS. DISTANCE FROM NL SITE

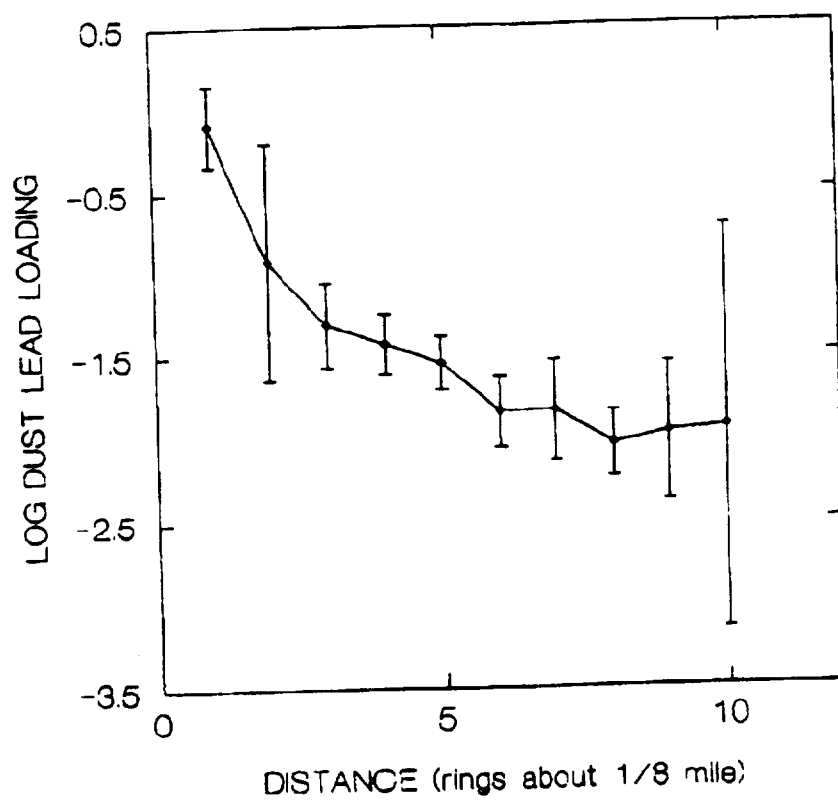


Figure 11

MEAN YEARS OF EDUCATION VS. DISTANCE FROM NL SITE

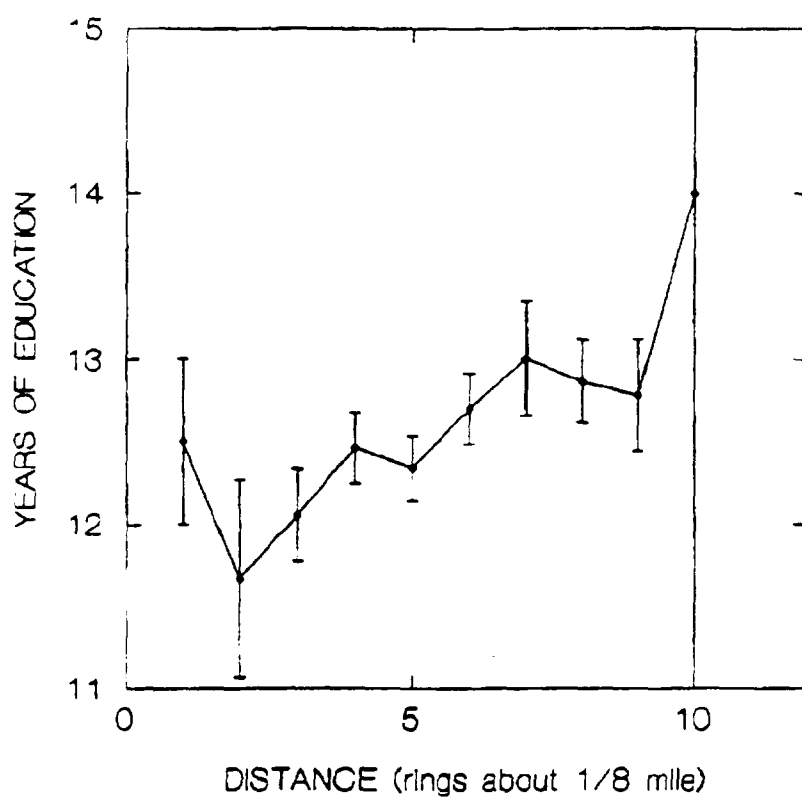


Figure 12

MEAN INCOME VS. DISTANCE FROM NL SITE

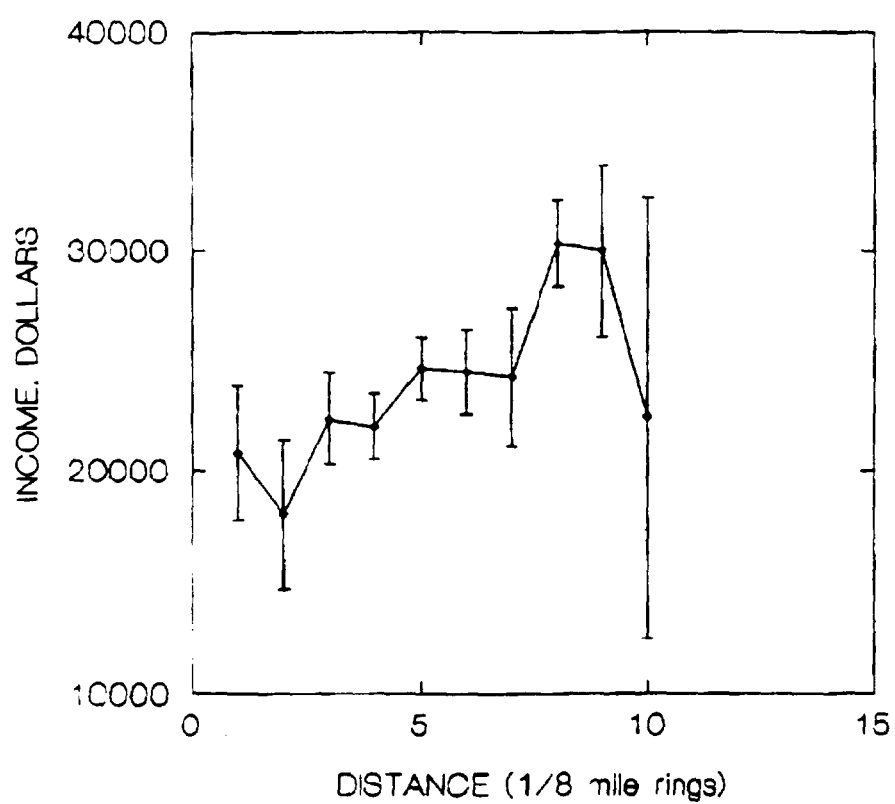


Figure 13

NUMBER OF CHILDREN IN HOUSE VS. DISTANCE FROM N.L.S

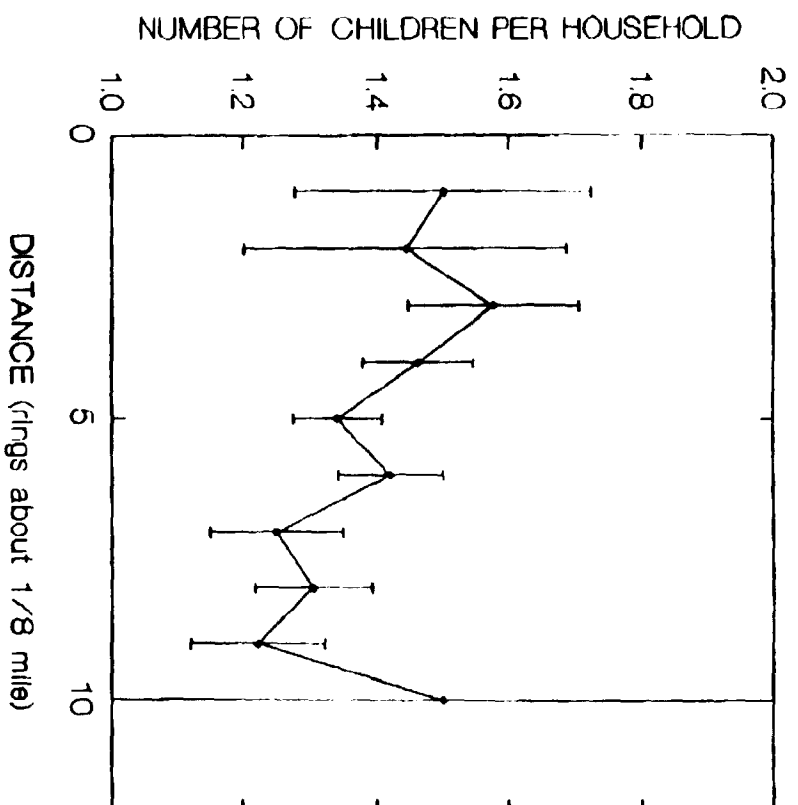


Figure 14

MEAN BUILDING CONDITION VS. DISTANCE FROM NL SITE

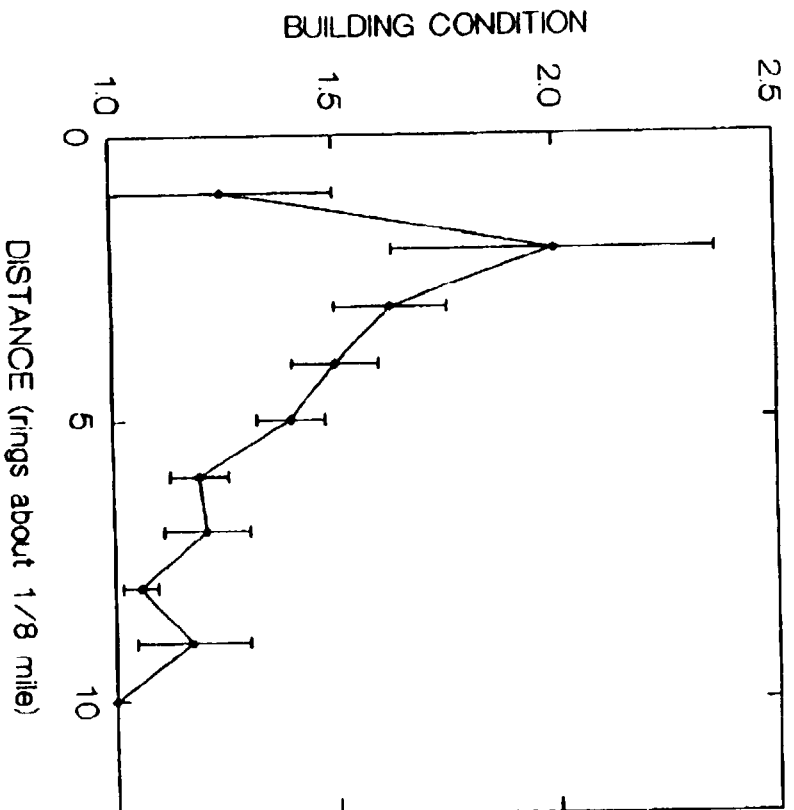


Figure 15

PERCENT WITH AIR CONDITIONING VS. DISTANCE FROM NL S

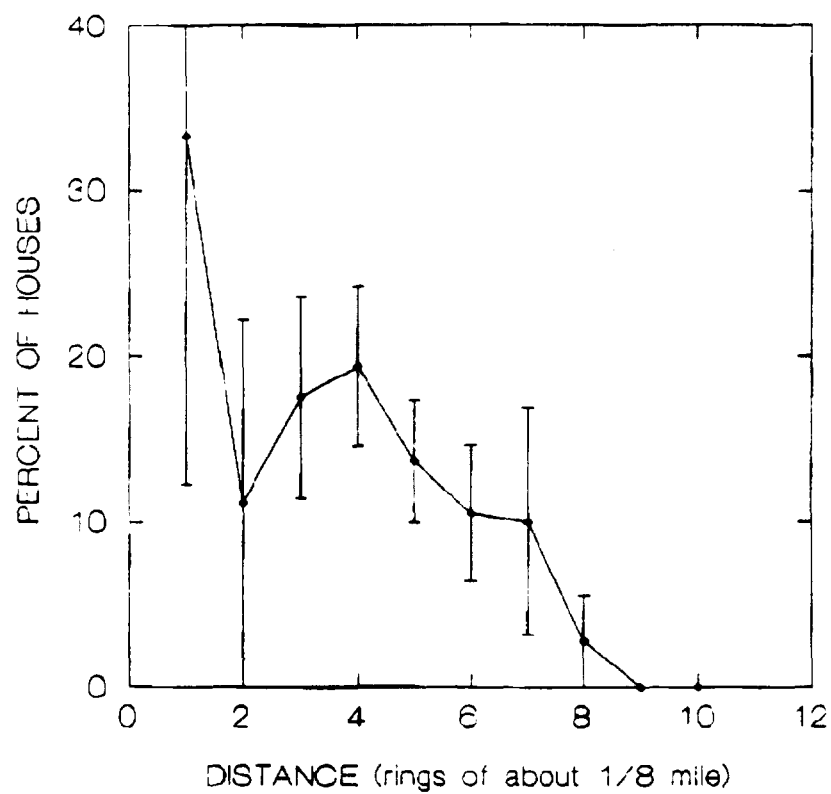


FIGURE 16

HOURS OF OUTDOOR PLAY VS. DISTANCE FROM NL SITE

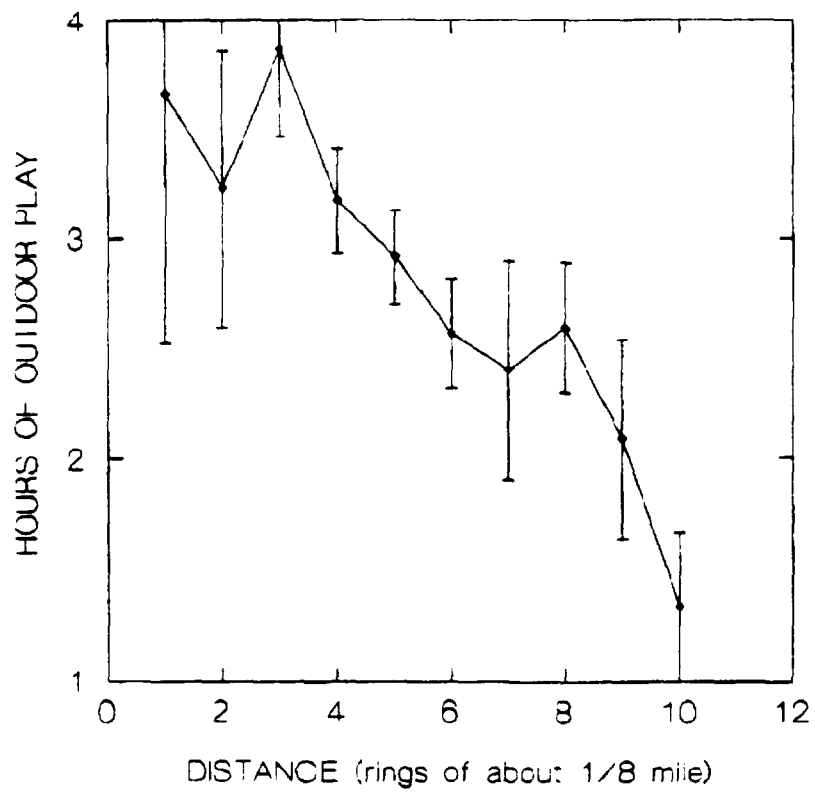


FIGURE 17

HOURS OF PLAY ON FLOOR VS. DISTANCE FROM NL SITE

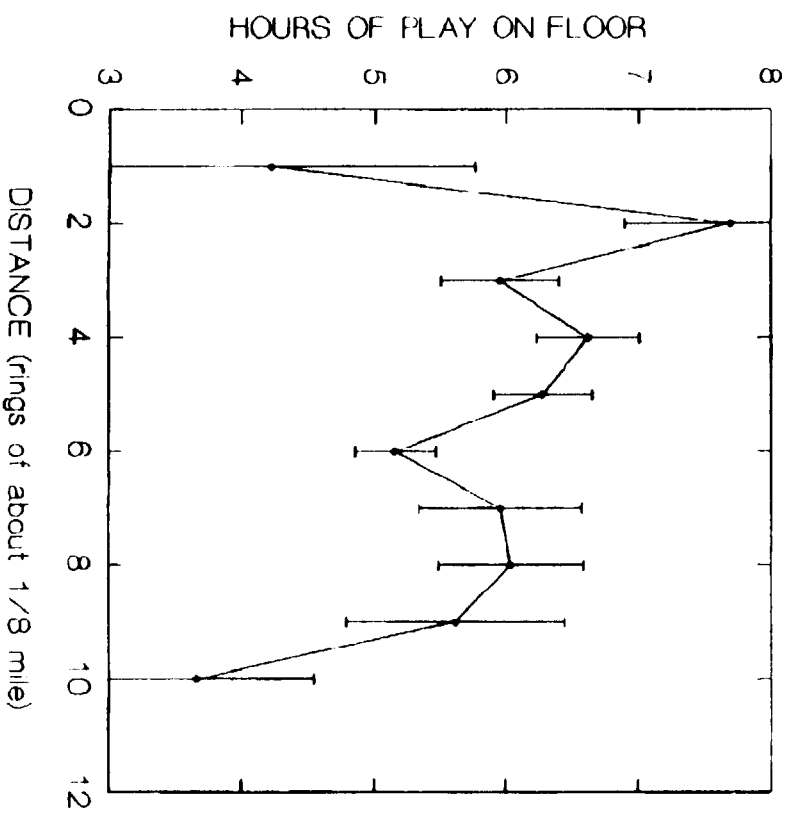


FIGURE 17a

BCVALID1.ASC

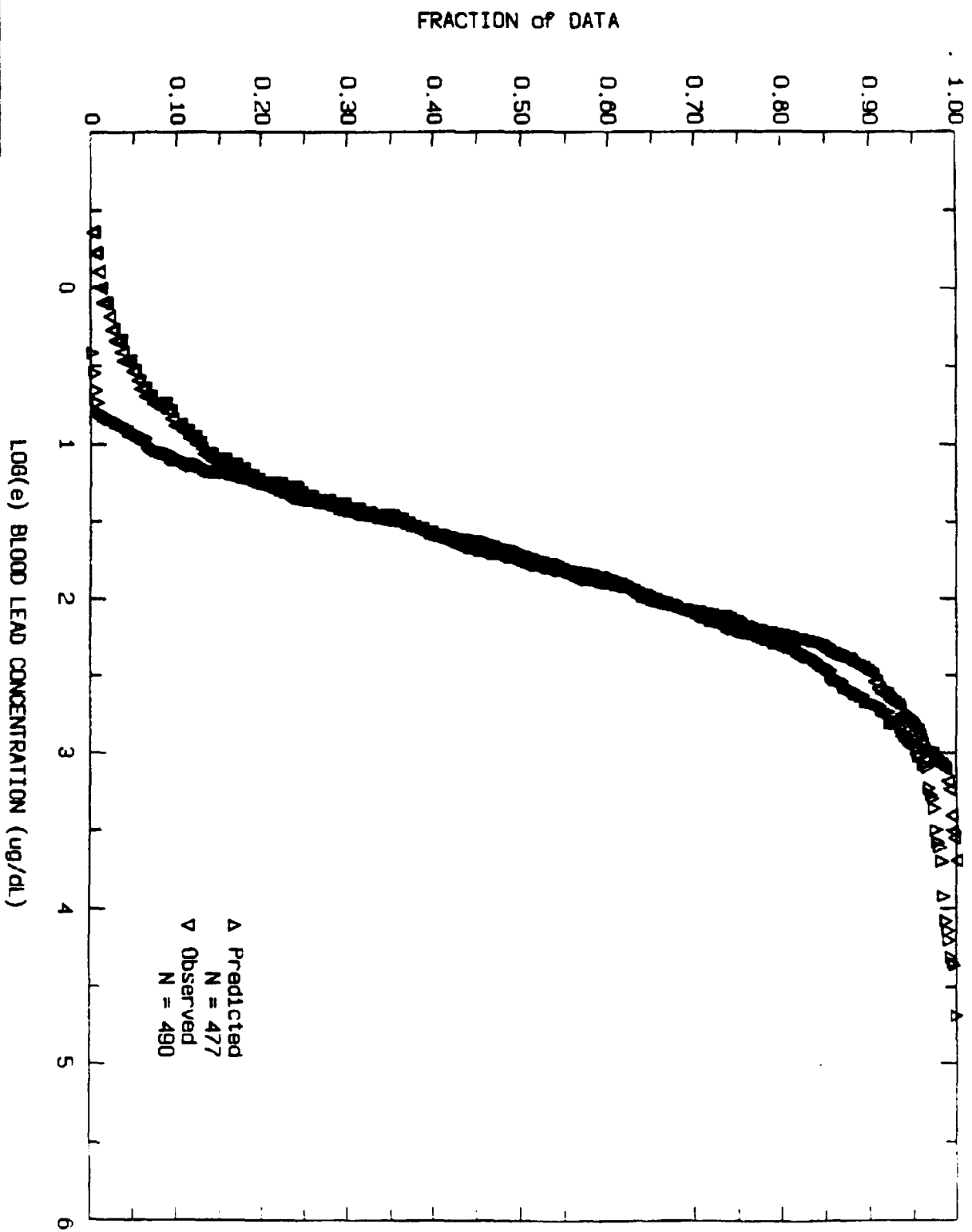
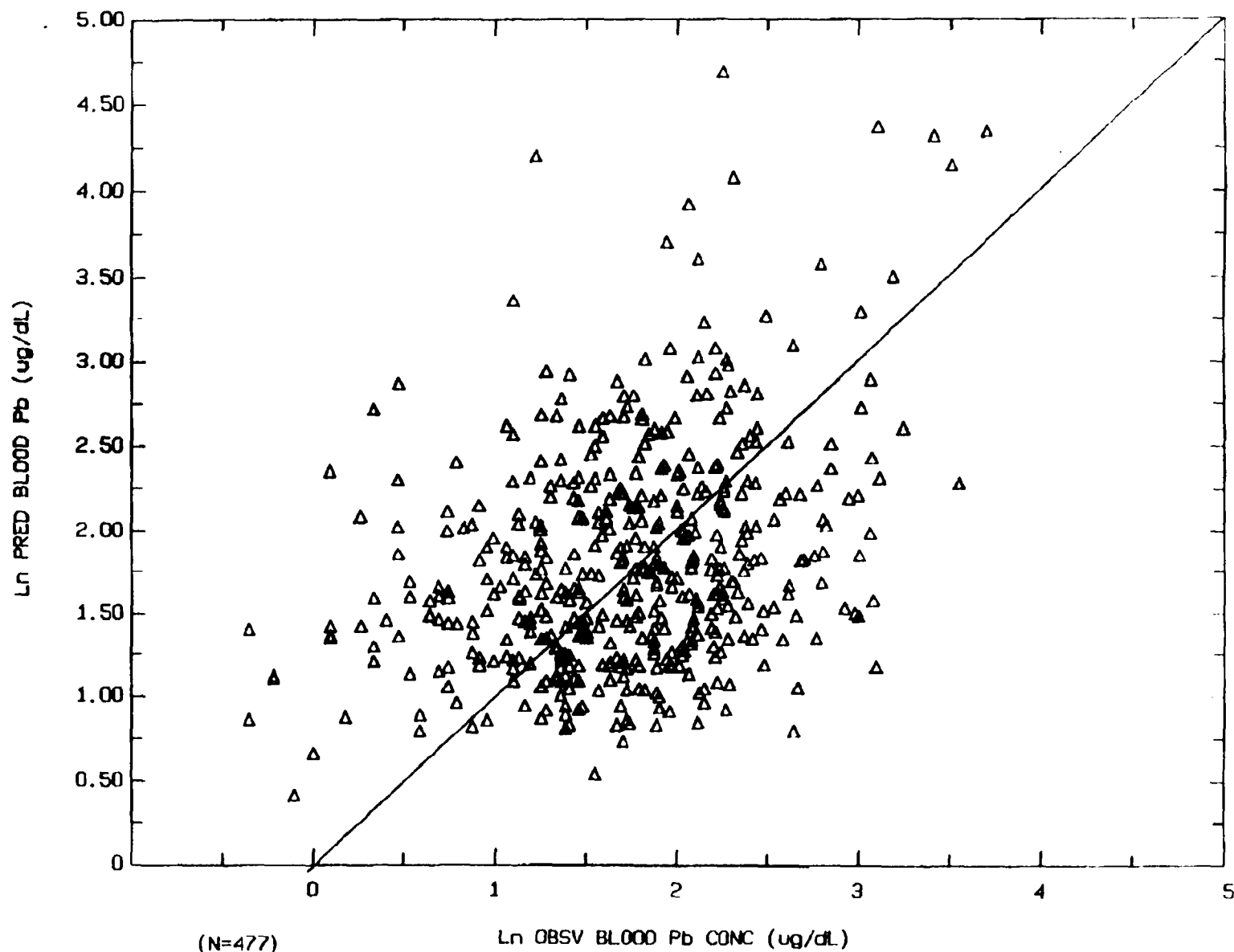


FIGURE 18



(N=477)
($r=0.34$)
(13 Missing Value(s))

GCVALID1.ASC

FIGURE 19

GCVAL1D1.ASC

(N=477)
(r=0.40)
(13 Missing Value(s))

OBSERVED BLOOD Pb CONC (ug/dL)

PREDICTED BLOOD Pb (ug/dL)

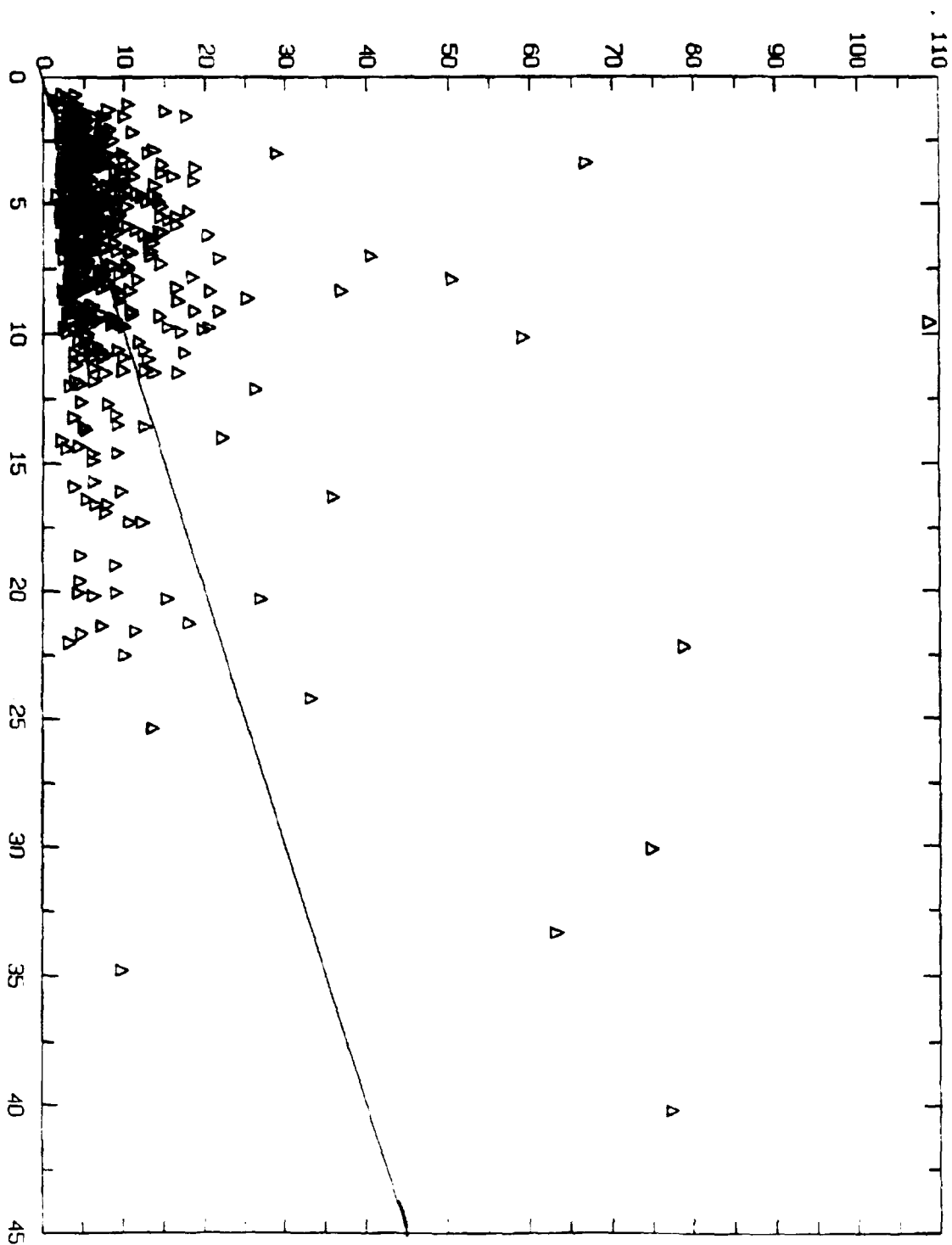


FIGURE 20